DOCUMENT RESUME

ED 314 941 FL 018 284

TITLE Preparing Refugees for Skilled Employment: Methods and Materials for Coordinated Instruction in Vocational Skills, English as a Second Language, Mathematics, Work Orientation and Independent Job Search.

INSTITUTION Jewish Employment and Vocational Service, Philadelphia, PA. Center for Career Services.

SPONS AGENCY Pennsylvania State Dept. of Public Welfare, Harrisburg. Office of Policy, Planning and Evaluation.

PUB DATE 87

NOTE 135p.

PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC06 Plus Postage.

DESCRIPTORS Assembly (Manufacturing); Classroom Techniques; *English (Second Language); Instructional Materials; Job Search Methods; *Job Skills; Limited English Speaking; Mathematics Instruction; *Program Design; *Refugees; Second Language Instruction; Skilled Occupations; Teaching Methods; *Vocational Adjustment; *Vocational Education; Woodworking

ABSTRACT

This manual serves as a guide for the evaluation, design, administration, and teaching of vocational training programs for limited-English-proficient (LEP) students, based on a coordinated vocational skills curriculum developed for refugee clients. The vocational focus of the program is woodworking and skilled assembly, but the principles of program design and the pedagogical concepts are transferable to instruction in other trades, vocational English as a Second Language (VESL), vocational mathematics, work orientation, and job searching. The manual is divided into four parts. The first part outlines the following issues in the design and implementation of specialized vocational training programs for LEP students: (1) evaluation and selection of trade areas; (2) curriculum design and coordination; (3) selection of language(s) of instruction; (4) testing and evaluation; (5) program marketing and job development; and (6) counseling and placement. Part 2 presents 7 sample project plans, with instructor's notes for curriculum developers and vocational trainers, and examples of project-specific exercises in VESL, mathematics and mechanical drawing. Part 3 contains sample exercises in technical vocabulary development, English grammatical structure, oral communication skills, mathematics and measurement, and mechanical drawing and design. An annotated bibliography of teaching and reference materials comprises part 4. (MSE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED314941

PREPARING REFUGEES FOR SKILLED EMPLOYMENT:

methods and materials for coordinated instruction in vocational skills, English as a Second Language, mathematics, work orientation and independent job-search

Center for Career Services
Jewish Employment and Vocational Service
Philadelphia, PA

Funded by the Office of Policy, Planning and Evaluation
Department of Public Welfare
Commonwealth of Pennsylvania

FL 018 284

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Sherman, A.

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

PREPARING REFUGEES FOR SKILLED EMPLOYMENT:

methods and materials for coordinated instruction in vocational skills, English as a Second Language, mathematics, work orientation and independent job-search

Center for Career Services
Jewish Employment and Vocational Service
Philadelphia, PA

Funded by the Office of Policy, Planning and Evaluation
Department of Public Welfare
Commonwealth of Pennsylvania

Copyright © 1987 by Department of Public Welfare,
Commonwealth of Pennsylvania

PREFACE

In its State Plan, the Commonwealth of Pennsylvania states its commitment to assist refugees in their efforts to achieve economic self-sufficiency as they re-settle here.

The Office of Policy, Planning and Evaluation, Department of Public Welfare, has directed the Refugee Resettlement Program to develop and to implement a social service program which will accomplish this goal. As part of this effort, the Refugee Resettlement Program contracts with the Jewish Employment and Vocational Service (JEVS) agency to provide employment services and vocational training in Southeast Pennsylvania.

The goal of the employment services presented by JEVS is to serve refugees efficiently and effectively by promoting their independence as early as possible. This is accomplished by assisting refugees to secure and to maintain unsubsidized employment. In response to the need of refugees lacking education, transferrable skills, and/or transferrable work experience, JEVS also offers a vocational training track. These two efforts encourage the refugee to avail himself of services which support decreasing dependency on public assistance and attainment of self-sufficiency.

The Refugee Resettlement Program and JEVS have worked cooperatively since 1984 in planning refugee employment services. One of the more successful endeavors has been the Refugee Training Program, a unique VESL training opportunity for refugees. This program has offered more stable positions, better hourly wages, more medical benefits, and more job potential for refugees.

This manual, funded by the Department, has therefore been developed by JEVS because we both attest to the positive impact of the Refugee Vocational Training Program and want to share information about such a program with other social service providers. We encourage your use of this manual and invite your response.

Refugee Resettlement Program
Office of Policy, Planning and Evaluation
Department of Public Welfare
Commonwealth of Pennsylvania

FOREWORD

Essential to the success of a vocational training program is the selection of staff who exhibit outstanding qualities of dedication, motivation and professionalism. In our experience we have found that merely having technical knowledge of a particular field is not enough to maintain the level of performance necessary to motivate refugees to cope with the range of cultural, social and economic problems which develop in the process of becoming self-sufficient. When hiring staff it is necessary to determine the capacity of the applicants to work as team members. Critical to the team orientation in work is the willingness and capacity to empathize with the issues confronted by students in each component of the program. For example, a job developer must be able to acquire a good understanding of each student's style of interacting and performing in the classroom in order to determine his or her appropriateness for a prospective job. Similarly, vocational instructors serve their students best when they are capable of dealing with technical shop issues and are at the same time sensitive to the English-language limitations of their students.

The Center For Career Services (CCS) Refugee Vocational Training Center program described herein has been most fortunate to have a staff exhibiting the highest standards of professional skill and unique qualities of dedication to their students. Such support is invaluable in implementing a successful training program for Limited English Proficient students, and the capacity to build such a team should be a pivotal consideration in determining the feasibility of setting up similar programs.

Aryeh Sherman, Director
Center for Career Services
J.E.V.S., Philadelphia

TABLE OF CONTENTS

Introduction	i
Acknowledgements	ii
Program Design	1
Projects	19
Exercises	45
Technical Vocabulary	45
Structure	60
Communication	73
Mathematics & Measurement	91
Mechanical Drawing & Design	103
Annotated Bibliography	113

Introduction

INTRODUCTION

It is common practice to place refugees in unskilled positions as a practical and expedient means for promoting rapid attainment of economic independence. It is well known, however, to refugees and employment service providers alike, that unskilled labor is typically unstable and low-paying, and that it provides little in the way of potential for advancement. While the relatively high levels of unemployment and dependence upon Public Assistance indicate the need for the timely placement of large numbers of refugees, it is clear that the *quality* of placements figures significantly in the refugee's willingness to accept employment, in job retention, and in the potential for personal skills and economic development. Rapid placement, if it does not meet or promise to meet the basic needs of refugee clients, provides little assurance for rapid transition to financial independence.

Vocational training can serve as a means for obtaining stable, well-paid, skilled entry-level employment, but mainstream programs often demand extensive time commitments, and are usually not prepared to deal with the special needs of Limited English Proficient students, let alone those of recently arrived refugees. Moreover, entrance requirements for such programs typically exceed the English proficiency and educational backgrounds of a significant proportion of the refugee population targeted for early placement.

An effective—and proven—alternative to these approaches is short-term vocational training designed to meet the refugee's need for appropriate education and work orientation while satisfying the demands of the local skilled-labor market. The following discussion and pedagogical materials are drawn from the experience of designing and delivering such a program in the Philadelphia area, and are offered as a contribution to the development of appropriate and effective educational policy and programs for refugees.

This book is intended as a guide to the evaluation, design, administration and teaching of vocational training programs for Limited English Proficient (LEP) students, based upon the implementation of the coordinated vocational skills curriculum developed for refugee clients by the Center for Career Services (CCS) of the Jewish Employment and Vocational Service, Philadelphia. While the vocational focus of the CCS program is Woodworking and Skilled Assembly, the principles of program design and pedagogical concepts presented here are readily transferrable to instruction in other trades, general vocational ESL, vocational mathematics, work orientation and job-search.

This manual is divided into four parts. Part One provides a survey of key issues in the design and implementation of specialized vocational training programs for LEP students, including: evaluation and selection of trade areas, curriculum design and coordination, selection of language(s) of instruction, testing and

evaluation, program marketing and job development, and counseling and placement. This section is intended not only for program developers and teachers, but also for vocational and employment counselors, as it lays out the factors necessary for the evaluation of the appropriateness of both specialized and mainstream training opportunities for refugees and other LEP clients.

Part Two consists of seven sample project plans, with instructor's notes for curriculum developers and vocational trainers, and examples of project-specific exercises in VESL, mathematics and mechanical drawing, intended to demonstrate some possibilities for lesson coordination.

In Part Three is presented a collection of sample exercises in technical vocabulary development, English grammatical structure, oral communication skills, mathematics and measurement, and mechanical drawing and design. In the interest of economy, we have included here a limited selection of examples of materials and activities developed specifically for the CCS course.

As an aid to the development of vocational curricula, an annotated bilibliography of teaching and reference materials is presented in Part Four. All of these materials have been reviewed and/or utilized by the CCS staff in the design and teaching of the coordinated vocational skills program.

In developing its curriculum and instructional materials, and in compiling and editing this manual, the staff of the CCS Refugee Vocational Training Center has consistently sought to evaluate its activities in terms of appropriateness and practicality. In consideration of the immediate, practical needs and concerns of service providers, theoretical issues have been deemphasized here in favor of presenting useful observations and effective teaching materials drawn from actual experience in the training of refugee clients.

Users of this manual are invited to photocopy or adapt any of the materials presented here for use in developing and/or teaching vocational training or other adult education programs for LEP students.

ACKNOWLEDGEMENTS

Preparing Refugees for Skilled Employment was designed and compiled by the CCS Refugee Vocational Training Center staff: Jonathan Binzen, Mihaela Farcas, Carolyn Haynes, Robert Klotz, and Patrick Triano, with the assistance of Omega Moore, Joshua Markel, Stephen Jones and Arlene Walker. Text and notes by Robert Klotz, with Jonathan Binzen and Carolyn Haynes. Exercises designed, compiled and edited by Patrick Triano, with Mihaela Farcas and Carolyn Haynes. Project perspectives and plans by Cristiana Dimitriu and Radu Savovici. Text design by Lisa Groomes. Photographs by Nabil Mehchi.

"This is just to say" reprinted by permission of New Directions Publishing Corporation, from William Carlos Williams, *Collected Poems: 1909-1939, Volume II.*

The Refugee Vocational Training Center program and *Preparing Refugees for Skilled Employment* are projects of the Center for Career Services, Jewish Employment and Vocational Service (Philadelphia), funded by the Office of Policy, Planning and Evaluation, Department of Public Welfare, Commonwealth of Pennsylvania.

Part I: Program Design

PART ONE. ISSUES IN PROGRAM DESIGN AND IMPLEMENTATION

Identifying Viable Trades for Vocational Instruction

In selecting appropriate fields for vocational instruction, it is necessary to consider numerous economic, demographic, cultural and logistic factors. Evaluation of these factors should include research into employer/industry requirements and prospects, and client needs and expectations. Among the key issues which should be taken into consideration are:

- *Projected availability of positions*

A great deal of published data, well-informed opinion, and popular speculation is available on projected demand for workers in various trades and professions. Tied to political and economic factors at the international, national, state, local, and individual company levels, this is understandably the most difficult information to interpret. For example, the original research conducted for the CCS Refugee Vocational Training Program in the spring of 1985 yielded contradictory indications as to the availability of woodworking positions in the Delaware Valley. The Pennsylvania Department of Labor and Industry report on projected employment figures suggested that the total number of positions in selected woodworking fields would be low compared to the number of trainees expected to be served by the program (Philadelphia SMSA. *Occupational Trends and Outlook for Total Civilian Employment, 1980 and Projected 1990.* Philadelphia: Commonwealth of Pennsylvania, Department of Labor and Industry, Office of Employment Security, 1984). Local employers in these and allied fields, however, informed us that there would be a much greater demand. To allow for the former situation, a decision was made to broaden the scope of the program to allow for placement in other skilled positions. This was a good decision in terms of providing more employment possibilities for our trainees, but ultimately it was the information obtained from employers which proved to be most accurate. While our trainees have been placed in skilled assembly, plastic and metal fabrication, and machine operator positions, among others, we have rarely experienced a lack of available woodworking positions. In the spring of 1985 there were also rumors of impending drops in interest rates and a consequential rise in demand for woodworking construction labor. At the same time, there was much discussion locally regarding the displacement of manufacturing by the service industries nationally and in Philadelphia. With the subsequent lowering of interest rates, carpentry and production cabinetmaking have been very healthy. In addition, there has been a reaction to the initial signs of decline in local manufacturing, leading to a revitalization in Philadelphia's industrial job market (Derr, Thomas. "Revitalizing City's Manufacturing Base," *Focus* (February 11, 1987), pp. 21-5). Although all of the available data guided

the planning of the CCS program, we attribute the success of our choice to initial discussions and subsequent ongoing consultation with local employers.

- *Stability of the workforce*

A high turnover rate is almost always a factor of adverse working conditions and/or low salary and poor benefits. As refugees, like most Americans, generally respond negatively to low-paying, unpleasant work, there is little reason to suspect that they will have better retention in such situations. Not surprisingly, typically unstable positions usually require little or no formal training.

- *Seasonal effects upon employment*

While many industries and service fields experience seasonal variations in employment levels, some are especially liable to long-term or frequent layoffs. Roofing and exterior painting, which can be highly lucrative, are subject to seasonal and day-to-day weather conditions. Proper training in dealing with layoffs and irregular work schedules in such high-paying positions would probably offset some of the risks of low retention. In general, however, stability is a major consideration for refugees in entering the workforce, and care should be taken to ascertain client interest in and understanding of such employment situations.

- *Minority access*

Equal Opportunity is an ideal yet to be achieved in many trades and professions. Consultation regarding minority employment with prospective employers is crucial prior to setting up a training program. Site visits, if possible, are a useful means of confirming minority access. In addition, minority trades and professional organizations and local ethnic associations will usually have good information regarding employment possibilities in certain fields.

- *The role of unions*

If a particular field is heavily unionized, information regarding membership, apprenticeship programs, and hiring practices should be reviewed. As union jobs often have better wages, benefits and job security than non-union positions, competition for them is high. While it may be difficult for refugee clients to gain entry into some union shops, our experience has generally been very positive.

- *Prior refugee (LEP) participation*

Many employers have had experience—both positive and negative—with immigrant and refugee workers. The best information regarding on-the-job communication skills/difficulties and the success rate of LEP employees can be obtained directly from employers themselves.

- *Entry-level salary and benefits*

The primary goal of training should be placement into positions with relatively high earning potential, stability, and opportunities for further skills development. In the case of clients on Public Assistance, entry-level salary and benefits are of immediate concern, and discussion of 'potential' is frequently a waste of time.

Unfortunately, the entry-level salary range and benefits of many skilled positions are bound to be judged by the client as inadequate. In many instances the client is right, and if he or she has a large family, virtually no entry-level position is sufficient to offset lost DPW benefits. In selecting a field for vocational training, then, it is important to consider not only actual entry-level and potential earnings/benefits, but also the expectations of the clients. If employment service clients usually request $5.00 to $6.00 per hour plus full benefits, an entry-level placement range which falls far below is bound to be problematic. We have found that a combination of individual counseling and in-class discussion regarding salary and benefits issues is helpful in convincing some clients of the benefits of accepting a little less when particular positions offer greater potential for economic and professional growth.

- *Potential for advancement*

Our experience in general employment placement has shown that most clients are concerned primarily with immediate issues of adequate wages, benefits, and job stability. Our concern extends beyond this, as we recognize and want to encourage the potential in some clients to develop additional skills and to attain more advanced positions. As hourly wages in excess of $15 and the possibility for developing technical, design, drafting, managerial and entrepreneurial skills exist in the field, woodworking further recommended itself in our original planning of the CCS program.

- *Minimum vocational/educational requirements*

Many industrial and some service positions require minimal training which can be accomplished on-the-job in a period from a few hours to a few weeks. Others require extended periods of hands-on and classroom instruction—sometimes up to several years. It is helpful to review the general training requirements for the various 'work groups' specified in the Department of Labor's *Guide to Occupational Exploration* (1979) prior to selecting a field for vocational instruction. The Department's *Dictionary of Occupational Titles* (1977) is also useful as a source of information on skills and responsibilities for various job titles. Major considerations in the design of the CCS program were time and client background. Through discussions with employers and use of the guides mentioned above, we were able to set 15 weeks as a feasible limit to the woodworking/skilled assembly curriculum. We understood that some clients with considerable experience in woodworking abroad and relatively good communication skills would be able to complete the program in a shorter period. Woodworking/skilled assembly was also appropriate to the targeted client population which we serve: those with limited educational background and elementary English and math skills.

It is understood that no training program, and especially a short-term program such as ours, turns out accomplished tradespeople. Given the limited time available and the background of our trainees, however, we have been successful in providing refugee clients with the basic skills necessary to enter, retain, and grow in skilled positions.

- *Location/access to worksites*

Many refugees are reluctant to travel far from their neighborhoods, even when the extra distance represents a considerable increase in opportunities and wage/benefit possibilities. In planning the CCS program, we realized that in the Philadelphia area some of the best positions in woodworking are to be found in outlying Delaware, Montgomery, Bucks, Camden and Burlington counties. Through intensive counseling and the presence of clients placed early on who have spread the word regarding the benefits of traveling, we have been able to take advantage of these placement opportunities. Access to public transportation is not usually a good selling point to refugee clients. Carpools are much more agreeable, although they too are risky when they depend upon a single car and driver.

- *Level of independent activity*

Some trades, for example, residential electricity, plumbing, heating, and carpentry, typically require a good deal of interaction with customers, entrepreneurial skills, tools, and a car or truck. The prior skill levels of clients entering a training program in such fields should be high enough to allow for placement into positions where personal ingenuity and independent work are required. Trade areas which rely less upon communication skills or independent activities are more appropriate for LEP refugee clients in general.

- *Client interest*

Canvassing potential trainees and studying refugee placement patterns is essential in designing and evaluating vocational programs. Research into client training interests in the spring of 1985 suggested woodworking, machine tool operation, sewing, and auto mechanics as highly valued. Of these, woodworking was most often requested, and at the time, unavailable to low-income clients in the Philadelphia area.

- *Cultural biases*

Directly associated with client interest are cultural biases. For each ethnic group there are culture-given expectations about the kinds of work performed by men, women, young people, educated people, etc., and there are attitudes regarding the value and appropriateness of different jobs. Ethnic community associations and employment counselors working with refugee populations should be consulted regarding training options in respect to cultural attitudes. As Southeast Asian refugee women frequently take jobs in factories, it was our initial expectation that we could recruit them for 'skilled assembly' training. Once the refugee communities understood that the chief vehicle of the CCS program was woodworking,an activity believed to be appropriate only to men, the chances of training Asian women became negligible. To date the program has attracted just one woman, a former factory worker from Poland, who has been among our most successful trainees.

- *Clients' prior experience abroad*

Interest in specific areas of work is often tied to past experience, either in the client's home country or the refugee camps. The farmers of Cambodia, Laos and Vietnam typically did much of their own cabinetmaking and carpentry, making woodworking or similar training an appropriate means for transferring skills.

Interest in sewing among women is usually sparked by familiarity with the field as well. Some clients, it must be noted, have little interest in reviving or refining skills developed in the past; woodworking, factory work and other low-tech employment may not meet the expectations of new Americans, however appropriate it might seem to service providers.

- *Clients' understanding of the job market*

Much information—accurate and not—regarding the local job market is available to clients directly from employed family members and friends. Success stories are bound to generate interest in certain fields, and as client participation is ultimately the prime factor in successful vocational training and placement, it is imperative that the clients' interests be met. If most clients aspire to become hotel housekeepers, the investment in time, energy and expense required to provide vocational training is probably not warranted.

- *Clients' expectations regarding training*

It is well known that short-term, cost-effective vocational training can be extremely useful in placing clients into stable employment. Many refugee clients, however, are attracted to long-term training, perhaps due to insecurity regarding personal ability to learn quickly or uncertainty about finding an adequate job. If other training options which meet the clients' expectations are readily available, enrollment in new vocational programs may be low until their benefits have been demonstrated to the community.

While far from complete, this list of considerations in planning new vocational programs presents most of the major issues and points up the importance of preliminary research conducted in cooperation with employers and the communities of prospective clients.

Curriculum Design and Coordination

Mainstream vocational training generally consists of a combination of hands-on practice and classroom instruction in work-related theory, e.g. electrical theory, budgeting, reading blueprints, etc. While some programs are able to offer tutoring in English and math to students with limitations in these areas, most are not equipped to deal with the special educational and cultural needs of LEP students, and especially those of refugees recently settled in the U.S.

Our experience in placing refugee clients in jobs since 1975 has shown that adequate communication skills and knowledge of local work attitudes and practices are perhaps as essential to successful employment as is the possession of vocational skills. To assist refugee trainees in 'catching up' on some of the essentials of communication, mathematics and dealing with the local work situation, the CCS Refugee Vocational Training Center program provides six hours of training daily, five days a week for up to fifteen weeks. Each six-hour day consists of three hours of hands-on practice, and three hours of classroom instruction in vocational ESL, mathematics, shop theory, work orientation and job search techniques. Shop and classroom instructors work as a team, and so are able to coordinate lessons and activities in ways which reinforce vocabulary, shop skills and the development of effective communication and problem-solving techniques.

Instruction in the CCS program is aimed at developing skills in nine areas: woodworking/skilled assembly, vocational English, basic mathematics, measurement, elementary mechanical drawing, wood technology, safety, work orientation and independent job-search.

In all of the areas covered, the development of problem-solving skills is a major consideration. Successful employment in skilled jobs usually requires an ability to make sound, independent decisions regarding the performance of tasks and the conduct of interactions with co-workers and supervisors. For LEP workers, and especially for refugees with little knowledge of U.S. work practices, solving problems on the job is particularly difficult. As job retention or personal safety may depend upon making and communicating appropriate decisions, it is crucial that students be prepared to evaluate tasks, dangerous situations, personal interaction, etc., and to recognize the importance of their personal role in developing on-the-job expertise and in protecting themselves.

One area of problem-solving which is particularly difficult for refugee clients is that of dealing with contradictory situations. In some cases, contradictions are simply confusing. For example, one is taught that the fraction $^{8}/_{4}$ is improper, and must be reduced to 2 in the context of mathematical computation; but when purchasing lumber, 2-inch thick stock is ordered as $^{8}/_{4}$. This, however, is a nominal measurement, as the actual measurement of $^{8}/_{4}$ stock will be approximately 2 inches and should be sufficient to yield $^{7}/_{4}$" boards.

In many instances, however, contradictory situations may present problems which affect job retention or physical safety. For example, our experience in general placement of refugees has shown that clients often resist being told to perform tasks not specified in their original job descriptions; reactions have ranged from grudging compliance, to resignation without notice, and rarely, to belligerent behavior. In some cases, being asked to perform additional duties is

indicative of a supervisor's confidence in a worker's abilities, while in others, it may be pure exploitation. Often, it is merely a matter of expedience, availability of staff, etc. In discussing work practices and on-the-job communication, it is necessary not only to prepare students for the possibility of unexpected duties, but also to provide information for the development of strategies for interpreting and dealing with it.

Contradictions abound in the area of safety, and it is essential that students be informed of potential hazards on the job, their rights as workers, and strategies for making appropriate decisions regarding their personal safety. For instance, while OSHA, the Occupational Safety and Health Administration, requires the use of a table saw guard for most standard cutting operations, such guards are not widely used in woodshops, as many woodworkers believe that they slow down production—and may, in fact, actually cause accidents rather than prevent them in some cases. In training refugee clients, then, one must present both the rule and the fact that the rule is often not observed. To refuse to use a table saw without a guard would probably result in short-term employment. On the other hand, there are many instances where it may be appropriate to request safety equipment or to refuse to comply with orders which place the worker in a potentially life-threatening situation. Unfortunately, refugee clients are generally oblivious to issues of worker's rights, and their own culture-given perceptions of status and responsibility might lead them to accept a supervisor's word without question. Teaching safety, then, can not merely consist of warning clients of potential dangers, but also must inform them of their rights, and assist them in developing a sense of propriety in dealing with the often contradictory factors which enter into making crucial decisions. (One way to assist clients here is to avoid referring them to shops where there are obvious safety violations; site visits usually give good indications of particular companies' observance of safety precautions.)

Our experience at the CCS Refugee Vocational Training Center has shown that clients appreciate and respond well to the challenges presented to them through the problem-solving approach to vocational instruction. It is evident that many of our clients have gone a long time without having had anyone challenge them intellectually, and it is is very satisfying for us to see refugee students obviously enjoying the often controversial discussions, in English, of work and work-related issues.

The nine components of the CCS curriculum are, as far as is possible and practical, coordinated to provide thorough instruction in a broad, yet carefully selected range of technical and communication skills. The primary criteria for inclusion of skills in the curriculum are:

• *Marketability*

Skills which are appropriate to the needs of the job market; which command the highest possible entry-level wages; which might make our trainees more attractive to local employers;

• *Potential for further development*

Skills which serve as a basis for further development of technical and communicative competence;

• *Practicality*

Skills which can be imparted successfully given the time limitations of the program and the educational limitations of the students;

• *Appropriateness*

Skills which meet not only the vocational needs of the students, but also those which provide intellectual stimulation, enjoyment, and generally serve everyday needs for more effective communication.

The major areas of concentration in each component are as follows:

• *Woodworking/skilled assembly*

The safe and proper use of stationary machinery, hand-held power tools, and handtools used primarily in woodworking, but also in metal and plastics fabrication, and in general skilled factory positions; the handling and use of materials; the techniques of cabinet joinery, with emphasis on procedures commonly followed in production shops; shop safety; tool and shop maintenance.

• *Vocational English*

Technical vocabulary; pronunciation and grammar; reading comprehension; communication techniques, including: asking for information, repetition, clarification; describing process and sequence of events; reporting past, current and potential situations.

• *Basic mathematics*

Review of basic arithmetic; fractions; simple geometry.

- *Measurement*

English system of linear measurement; denominate math.

- *Elementary mechanical drawing*

Interpreting and making mechanical drawings; perspective; scale.

- *Wood technology*

Study of the structure and properties of wood and wood products.

- *Safety*

Discussion of hazardous materials; occupational dangers; safety precautions; workers' rights; health issues.

- *Work orientation*

Study of local job market; transportation issues; local and general U.S. work attitudes and practices; on-the-job behavior and communication techniques; using the telephone; unions; salaries and benefits; upward mobility.

- *Independent job search*

Discussion of job search techniques, including networking, service utilization, newspapers, etc.; development of interviewing skills; application procedures.

Language of Instruction

One of the major considerations in the design of vocational training programs for LEP students is the choice of language(s) of instruction. Both monolingual and bilingual vocational training models can be effective, and the choice of one over the other is bound to be a matter of taste (i.e. educational philosophy and politics), program service objectives, and cost-effectiveness.

Bilingual Vocational Education (BVE) is essentially a model which incorporates vocational training in the clients' native language with supplemental instruction in vocational English as a Second Language, and which may have an additional adult basic education component in the native language (See Friedenberg, Joan and Curtis Bradley. *Bilingual Voc Ed.* Columbus: National Center for Research in Vocational Education, 1984). It is an effective a means for making vocational education available to LEP students who would otherwise be unable to compete in mainstream courses. As vocational instruction is in the native language, or

translated into that language by a bilingual assistant instructor, BVE allows for more rapid transfer of information and, in theory, acquisition of skills than is possible in an English-language vocational program. As the native language is the primary medium of instruction, clients with varying levels of proficiency in English can access the same educational program. In addition, BVE encourages cultural solidarity among the participants and allows for the design of a culturally sensitive curriculum.

Monolingual vocational instruction as implemented by the CCS program is designed to meet the special needs of a diverse group of Asian, African and European refugee clients. The cost of on-site bilingual instructors or interpreters for such a program would be prohibitive. As English is the sole language of instruction, the English proficiency level for entry into the program is relatively high (See below, for a discussion of evaluation procedures and entry requirements), limiting access to many who would appreciate and benefit from vocational training. The diversity of the student population has its advantages, however, in encouraging the use of English, which makes shop and classroom interaction more realistic. In addition, the exchange of experiences and ideas among members of different ethnic groups encourages better understanding of the general problems faced by most refugees in resettlement. One of the major advantages of BVE is its ability to meet to the special cultural needs of LEP students; while a multi-cultural, monolingual program cannot possibly attain the same level of specialization in service delivery, it can clearly provide effective and appropriate instruction.

Interest and Aptitude Evaluation

The screening of clients for participation in a vocational program should include both interest and aptitude evaluation.

The interest of participants is crucial to the success of the program; unfortunately, it is extremely difficult to gauge, and inevitably there are clients who enter such programs for reasons other than a desire for skills development and employment. In counseling prospective trainees regarding vocational training, we are careful to emphasize the client's obligation to accept a job when offered. Over the course of nearly two years, the CCS placement staff has gained a reputation for being serious about holding vocational training clients to their word, and today there are few clients who go to the trouble of enrolling with the expectation of not working.

Arriving at appropriate means for testing aptitudes, and especially for establishing entrance requirements is a long process. The difficulty of such testing is compounded by the lack of good evaluation materials appropriate to the LEP

population. At the CCS program we test for spoken English, English literacy, and basic arithmetic levels. The following summaries present the results of our experience in testing clients and adjusting entrance requirements:

- *English level*

From the outset we have used the Center for Applied Linguistics' *Basic English Skills Test (BEST).* Despite the fact that we find some of the situations, questions and interpretations in this test inappropriate, it has proven to be a useful tool in screening applicants. Although we have experimented with admitting clients with scores as low as 40, we generally require a combined Listening Comprehension, Fluency and Communication score of 55. Clients below this level tend to have difficulty in following classroom instruction in English and in communicating with teachers and employers. Exceptional woodworking skills—due to a combination of prior experience and vocational training—have allowed us to place some clients with English proficiency levels far below 55, but the risks of failure are high—both for the student and for the placement component of the program.

- *English literacy*

Due to the relatively short period allotted for training, homework figures significantly in the curriculum, and thus some literacy skills are required. To test literacy skills in English, we have adapted the format of the Jastak *Wide Range Aptitude Test (WRAT)* vocabulary assessment. Clients are asked to read a list of 35 individual vocabulary items, roughly half of which are sight-words commonly taught in survival ESL classes, with the remainder being items which reflect various sound-letter correspondence patterns in English. If there is evidence of understanding of the sound-letter correspondences, the client meets the minimum literacy requirements of the program. Most clients who qualify score in the 25 to 30 range. Although we have at times made exceptions to our literacy requirement, our experience with illiterate trainees has been disappointing.

- *Arithmetic*

Applicants are given a short test of addition, subtraction, multiplication, division and fractions. Solid evidence of ability to perform division is required for admission. If feasible, clients with knowledge of fractions are placed in a separate section from those with basic arithmetic skills. We have found that it is virtually impossible to introduce the notion of division and to teach the math/measurement curriculum in fifteen weeks, making knowledge of division an essential prerequisite to training. Many applicants are lacking in the basic arithmetic skills necessary to secure employment at higher, skilled levels.

Over a period of two years the entrance requirements of the program have risen, largely to meet employer needs and to ensure adequate comprehension of the curriculum. While prior experience and interest have undoubtedly figured in the success of some clients, English and math ability at the time of admission are clearly the most important factors in skills acquisition and placement.

Program Marketing and Job Development

Effective marketing is a crucial factor in the placement of vocational training graduates. The strategy of the CCS program has been to encourage the involvement of local employers: as consultants during the research and planning stage, and as advisors on curriculum development during implementation. In order to further encourage employer participation, the program staff provides, when appropriate, assistance in interpretation, translation, screening of applicants and the solving of on-the-job communication problems. All newly-contacted employers are routinely invited to inspect the training facility, and site visits by the staff job developer are usually made to factories and workshops before any placements are attempted. The development of close working relationships with employers has resulted in mutual trust which facilitates placement and encourages repeated utilization of the program as a source of new employees. In a few cases, employers have decided to dispense with the interviewing process altogether, relying solely upon the judgement of the CCS job developer.

Honesty has proven to be an essential factor in successful program marketing. Employers appreciate knowing, as completely as possible, the skills and limitations of a potential employee. In most cases, employers who are interested in hiring refugees will be open to working around limitations if skills and attitude are appropriate. When an employer knows what to expect from a new employee, he/she assumes some of the responsibility for the employee's success on the job. This tends to create a steadier employment situation, which in turn encourages flexibility and patience on the part of the employer.

The job developer's ability to market the program and its graduates is clearly enhanced by his/her understanding of the field and personal involvement in the education and counseling of the trainees. In the CCS program, the job developer also serves as a vocational counselor and job-search trainer. Occasionally working alongside the students in the shop, the job developer/counselor is able to gain the expertise necessary to discuss in technical terms the needs of employers and to appreciate the vocational strengths of individual students. In the classroom, the job developer frequently takes over the teaching of job-search techniques, and if appropriate, will accompany individual clients on their interviews.

Counseling and Placement

English-language vocational counseling not only aids in the development of communicative skills in refugee clients, but also reflects more closely the kinds of interaction which will arise in employment situations. Most of the counseling of program participants is therefore done by the job developer, with bilingual counseling provided by the CCS employment program staff when absolutely required.

While most program participants understand and accept the fact that employment follows vocational training, some of the clients' expectations regarding education and employment often lead to problems which are bound to challenge the skills of even the most adept employment counselors.

Despite the fact that the CCS program provides a reasonably accurate simulation of working conditions and a supportive atmosphere for the development of vocational and communication skills, some clients find it difficult to overcome the most pervasive of problems facing nearly all refugees on the verge of employment: fear. Regardless of the trust which develops between students and staff and assurances that potential employers understand the circumstances under which the client has been prepared for work, the unknowns in entering employment, especially as they concern personal ability, adequate salary and benefits, and job stability, are bound to influence willingness to accept placement. Experience has shown that the vocational ESL classroom is an ideal place for developing confidence: through discussion of personal problems, fears and priorities in regard to working, clients are able to work out strategies which will facilitate entry into the job market. This use of peer counseling is especially appropriate, as refugee clients typically tend to rely upon the advice of family and friends in making decisions about employment.

While utilizing the techniques and materials of woodworking as the primary vehicle of vocational instruction, the CCS program provides refugee trainees with the preparation necessary to assume positions in skilled assembly, fabrication and machine operation, working with metals, plastics and other materials. Some program participants, however, find it difficult to appreciate the value of the transferrability of skills from woodworking to allied fields. For many refugees, the notion of employment stability is equated with long-term, well-defined, static responsibilities and few expectations of change or skills development. While each individual must personally decide the extent to which he or she wants to develop a career, we recognize that survival on the job and the growth of earning potential often depend upon the ability to acquire additional skills and responsibilities. With changes in the economy, the job market and

technology, it is also clear that flexibility is bound to be crucial in maintaining employment. In counseling trainees about first jobs, we emphasize the fact that any employment situation can and should be a learning situation as well, and that it is through the ongoing acquisition of skills that salary, benefits and stability will be assured. We encourage trainees to take positions outside of the woodworking field, when appropriate, pointing out the advantages of developing a broader range of technical skills.

Many of our students have much more lofty aspirations regarding their long-term employment possibilities than those provided through training in woodworking/skilled assembly, and we encourage them to continue to work toward their goals. Our counseling focuses upon the importance of making a good start in developing personal talents and financial independence. We do not expect that all of our graduates will remain in the trades for which they have been trained, but we believe that the experience gained through initial placement in skilled positions will serve as the basis for successful, ongoing employment.

Individual differences in prior experience, aptitude, intelligence and learning styles obviously result in differing placement potential for program graduates. Most of our students, however, assume that graduation and the receipt of a certificate indicate mastery of all skills and access to all available positions in the field. The counseling dilemma imposed by this situation is indeed a difficult one: to encourage each individual to develop and appreciate his or her own skills and potential while attempting to downplay obvious, and at times serious, shortcomings. As we believe that nearly all of our trainees are capable of finding adequate, stable employment in skilled positions, we usually avoid discouraging students who are sincerely interested in learning and working. Individual counseling sessions are used to build the confidence of poorer students while preparing them for the necessity of being more flexible in their choice of placement opportunities. Experience has shown that some clients with relatively poor performance will improve once their learning problems have been acknowledged and strategies for compensating have been discussed with a counselor or vocational instructor. In a few instances, poor performance has been determined to stem from outside factors; appropriate counseling and referral to other support services have proven to be effective in turning some of these cases around.

Tied to the problems of client expectations and individual differences is the issue of early placement. While the CCS program is limited to 15 weeks of instruction per cycle, many clients are ready for placement much earlier. In some cases, students request and are offered jobs early on when financial problems, e.g. impending cuts in DPW benefits, threaten to interfere with training. Frequently, good opportunities arise at mid-cycle for clients who have demonstrated particular talents. Early placements such as these often arouse

interest in other program participants for more rapid employment. For some clients, however, the 15-week cycle becomes a personal requisite for completion of training. Ongoing counseling as to the benefits of early placement is essential and largely effective in convincing students to take advantage of job opportunities as they arise. As the receipt of a certificate is often an important issue to refugee students, all clients who accept early employment are awarded certificates.

The option to make early placements is not only ideal for the promotion of early employment for refugee clients, but also allows for more flexibility in job development. It is obviously easier to space placement activities out rather than having to concentrate on restricted periods of activity tied to graduation schedules. In addition, most industries are subject to seasonal slow periods in hiring and production/service activities, which might further restrict placement opportunities. When possible, it is advisable to schedule graduations to coincide with high activity periods within targeted industries and services; but more flexible program completion and placement policies, fully explained to students and employers alike, will make job development efforts more manageable and successful.

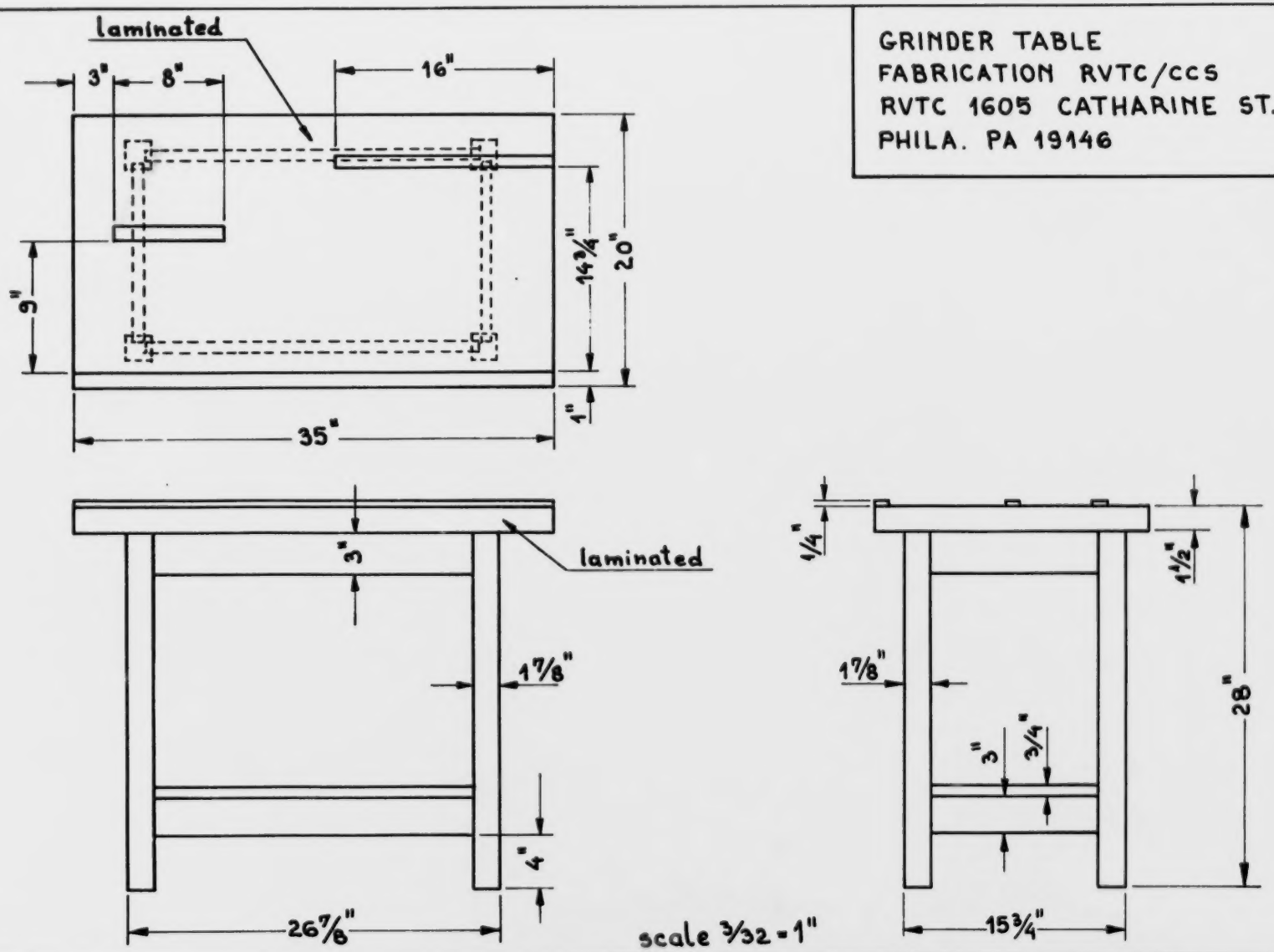
The proven strategy of placing clusters of refugee workers with particular employers is especially useful in facilitating the placement of trainees with weaker communication skills; once competent refugee employees have succeded in demonstrating their abilities to employers, subsequent refugee placements are generally possible.

An essential aid to job development and placement is follow-up and the provision, when appropriate and available, of support services to employers. Follow-up not only promotes ongoing contact for placement possibilities, but it also provides opportunities for offering support to clients and employers as they work out their initial period of adjustment to cultural and communicative differences. Offering to employers the special expertise and interpretive skills of counselors, trainers and educators can often mean the difference between retention and termination. The costs of such follow-up can usually be measured in short-term commitments of time, while the benefits to clients and employment/training programs are potentially great.

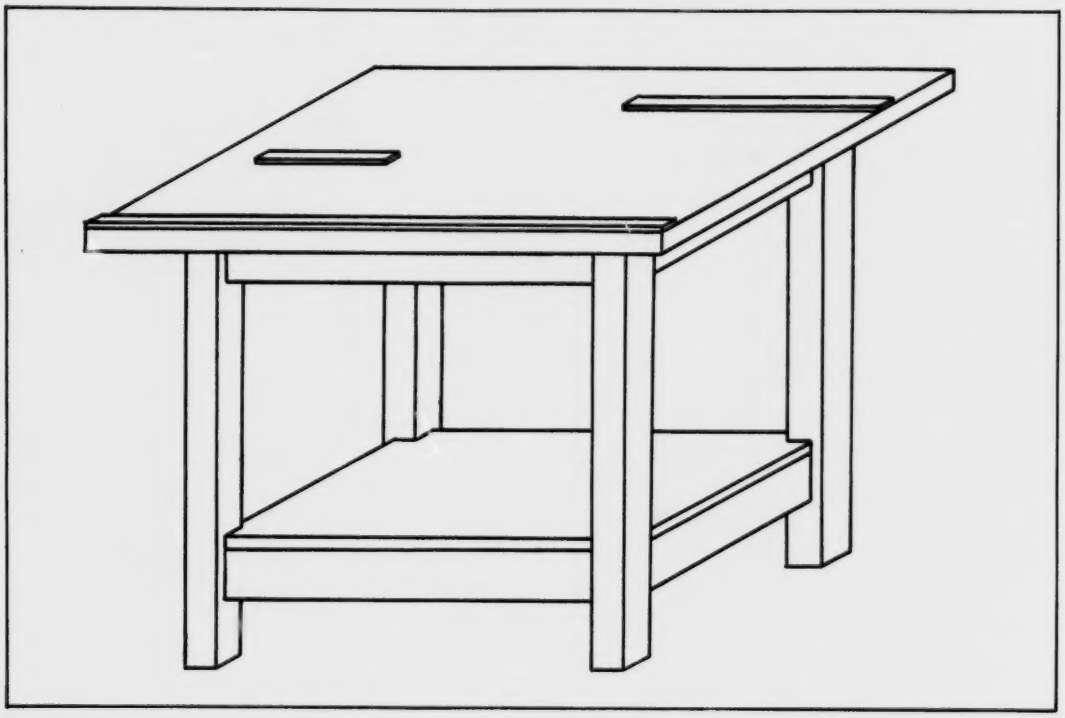
The integration of LEP refugees into the U.S. workforce has been, and will continue to be a difficult task which must rely upon the partnership of public and private-sector advocates. Employers who are willing to hire refugees in bona fide, long-term positions despite communication problems and the prejudices of American co-workers should be given recognition and should receive support services for their efforts. Such employers should be informed of appropriate incentives, such as tax credits, and programs, such as on-site educational support services (VESL), which might serve to promote further participation in the resettlement of refugees.

Part II: Projects

GRINDER TABLE
FABRICATION RVTC/CCS
RVTC 1605 CATHARINE ST.
PHILA. PA 19146



PROJECT I: GRINDER TABLE



This project is of very simple and straightforward design, and serves as an ideal first assignment for beginning students. It incorporates basic machining and cutting techniques, simple mortise and tenon joinery, and the application of plastic laminate.

The instructor is advised to use the first project as a means for assessing the basic skills, eye-hand coordination, manual dexterity and behavior of the students. The cutting and machining activities should be monitored with extreme care, to determine the ability of students to follow instructions and to work with dangerous machinery. As students, and eventually as skillled shop workers, the trainees will be expected to work independently, and it is crucial that the individual's strengths and limitations in such potentially hazardous situations are fully understood as soon as possible.

The need for precision and constant watchfullness in working with the table saw and other dangerous equipment cannot be overstressed. While it is counterproductive to instill too great a sense of fear in students, it is important to underscore the potential for serious injury when working with such machinery. Many students are able to develop proper technique and understanding of

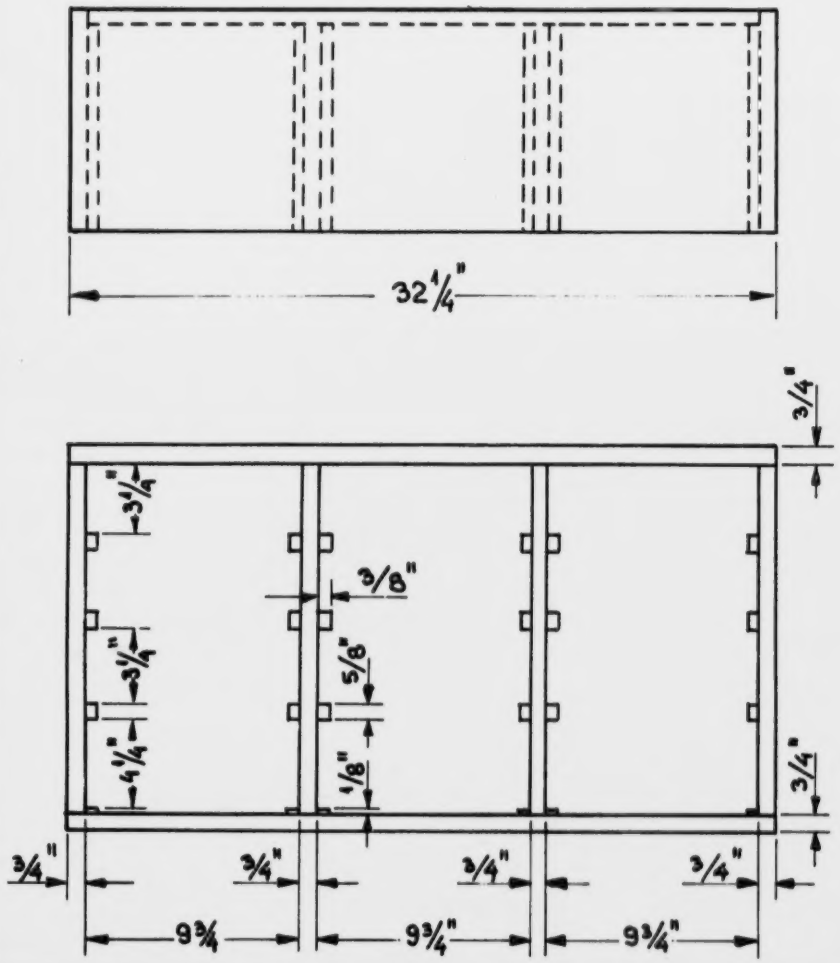
the machine, but some consistently fail to pay attention or to respond to warnings. The latter should be monitored closely, and if judged to be of danger to themselves or to others, are best forbidden to work without supervision and restricted in their use of the equipment to relatively safe operations, e.g. cross-cutting with a jig as opposed to ripping. While we would like all students to develop a broad range of skills through extensive hands-on practice, we recognize that individuals differ greatly in talent and temperament. Occasionally a student will confide in the counselor or instructor, usually as the result of a near accident, admitting a fear or dislike for certain tasks. In such cases, all efforts are made to encourage the student to develop skills in other areas.

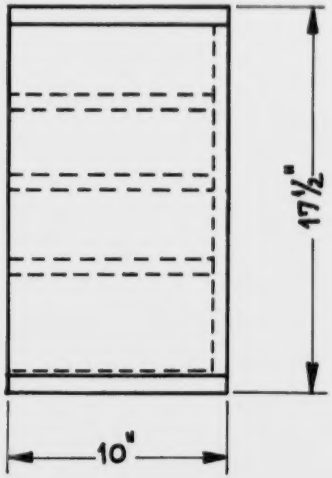
In addition to supporting the grinder, the table will be used for flattening plane soles using wet glass and sandpaper and for sharpening blades with a water-stone. As proper lamination of the table top should prevent seepage of water, the lamination exercise provides not only an introduction to the process itself, but also a good first illustration of the need for considering function in furniture design and construction. Issues of form and function are often addressed in both the shop and classroom components of the course, as the discussion serves to stimulate student interest in problem-solving, and gives the instructors a good sense of the individual student's understanding of project design.

The construction of tables, racks and jigs by the students is obviously of great benefit to the program as it reduces expenses. Students clearly take pride in using the furniture and equipment they have built, and the experience of constructing such items is useful for future employment, as woodworkers are often called upon to create machine supports, tables, racks, jigs, etc. in the course of their regular shop activities.

The flattening of handplanes and the sharpening of blades are skills which are not essential to the general production-shop woodworker, whose tasks typically require the use of power machinery. As they are of potential value in diverse trades and crafts fields, however, it is useful to provide instruction in sharpening and general handtool maintenance; possession of special skills in a production shop can lead to greater responsibility, and it is certainly worth the investment of several hours of instruction and practice to increase the breadth of knowledge and earning potential of trainees.

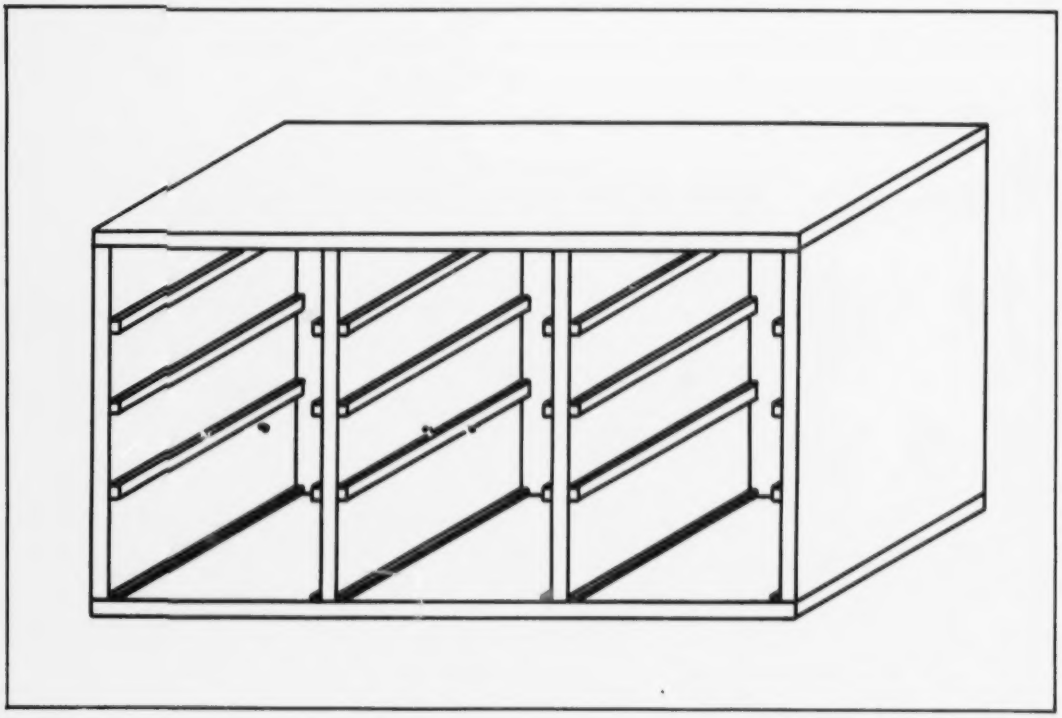
HARDWARE CHEST
FABRICATION RVTC/CCS
RVTC 1605 CATHARINE ST.
PHILA. PA 19146





scale 1/8-1"

PROJECT II: HARDWARE CHEST



The hardware chest is a simple project used to teach the fundamentals of cabinetmaking in plywood and plastic laminate. It is a blend of the extremes between which teaching moves: work done as a class and work done individually. When introducing tools or techniques, particularly when dangerous machines are involved, the slower, more easily controlled pace of group instruction is preferred. Only when all of the students have acquired the rudiments of a skill does individual work begin. The hardware chest embodies this progression, with the construction of the carcass serving as an introduction to the class of the skills necessary for the building of drawers by individual students.

The notion of ***square*** *is of critical importance to woodworking and many other skilled trade areas, and the construction of simple cabinets and drawers is an ideal means for illustrating the need for precision in measurement and allignment. The success of the project hinges ultimately on the ability of the students to perform accurately in measuring and squaring up the various component boxes.*

This project also provides a good introduction to production methods, as the construction of the drawers and runners is best accomplished through production of multiple identical parts. Here students must learn to determine the number of parts needed, to understand procedures and practices necessary for efficient production, and to develop skills in setting up machines.

The project plans provided here do not illustrate the drawers. In the execution of this project, we require that the students examine various sample drawers, and then determine the form that the drawers and drawer fronts will take. Through this, the students learn to view design and construction problems in terms of practical considerations.

Personal choice is also addressed here. While most students will not soon find themselves in postions where they can make their own design decisions, there are often cases where a woodworking problem can be approached in different ways. Throughout the course, the issues of variation and personal preference are taken up, to encourage the development of strategies for problem solving and to give individual students a chance to experiment with new ideas.

In addition to allowing for student input into the design of the drawers , the students also select the colors of plastic laminate to be used on the carcass and drawer fronts. This provides an opportunity to work with color terms and to explore basic aesthetic issues.

Lamination work entails the use of highly toxic contact cement, and it is advised that issues of personal health and workers' rights be discussed concurrently in the ESL classroom. Here it is important to stress that in some shops the use of protective equipment is treated as being optional, despite government regulations, and that it is the responsibility of the worker to look out for his or her own personal safety.

WORD PROBLEMS (HARDWARE CHEST)

Solve the following problems, using the illustrations provided below. (Drawings are not to scale.)

1. The width of a hardware chest is $32\frac{1}{4}$". The carcass and 2 vertical dividers are made of $\frac{3}{4}$" plywood.

a. How wide is one drawer front if there is a $\frac{1}{16}$" clearance on either side of the drawer?

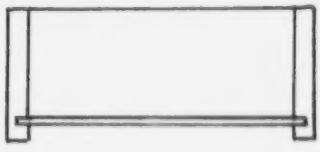
b. If the drawers are made of $\frac{1}{2}$" plywood, what is the inside width of the drawer?

2. The height of the same chest is $17\frac{1}{2}$". The runners for the top three drawers are $\frac{5}{8}$" each, and the runner for the bottom drawer is $\frac{1}{8}$". There is also a clearance of $\frac{1}{8}$" between the drawer top and runner (and between the top drawer top and carcass). The carcass is made of $\frac{3}{4}$" stock. If the drawer fronts are all the same height, how high is one drawer front?

3. Another chest is constructed the same way, but the drawers are *not* all the same height. If the top three drawer fronts are $3\frac{1}{8}$" high, how high is the bottom drawer front?

4. The depth of the carcass is 14". Stock for the back of the carcass is $\frac{1}{2}$" thick. The drawers are flush with the front of the chest, and all fours sides of the drawers are made of $\frac{1}{2}$" plywood. What is the inside depth of the drawers?

5. The sides of the drawer are 4 1/8" high. The bottom of the drawer is made of 1/4" plywood, and is inset from the bottom edge by 1/4". What is the *inside* height of the drawer sides?



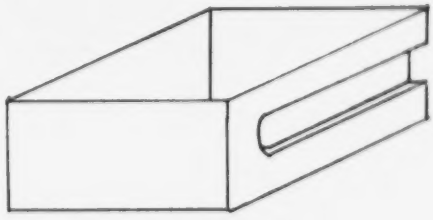
6. Another chest is 18" high, and there is no space between the drawer fronts.

a. If there are four drawers of equal height, how high is each drawer front?

b. How would you open the drawers?

c. How would you hang the drawers?

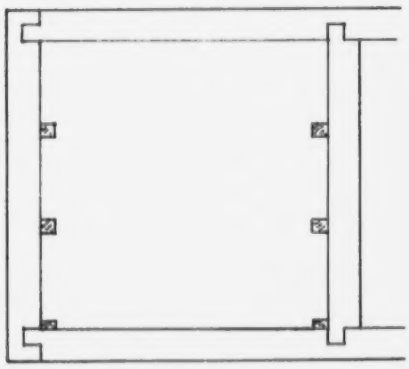
7. For the same chest, if you house a runner that is 3/4" wide and 1/2" thick, and center it on the side of the drawer, what is the distance from the bottom of the runner to the bottom of the drawer?



8. You are going to construct a hardware chest that will have three drawers, and each drawer front will be 5" high. The runners will be made of solid stock 5/8" by 5/8", except for the bottom runner which will be 1/8" thick. The carcass and vertical dividers will be made of 3/4" plywood joined with 3/8" rabbets.

a. How long must you cut the plywood for the carcass sides?

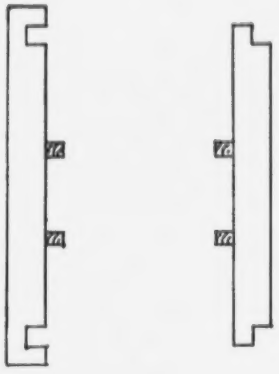
b. How long must you cut the plywood for the vertical dividers?



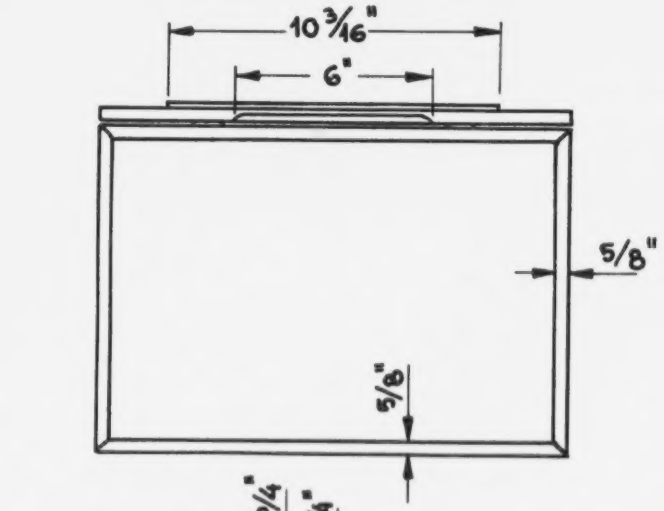
Except for the $^1/_8$" thick bottom runner, you want to fasten the runners to the carcass sides and vertical dividers before you assemble the chest.

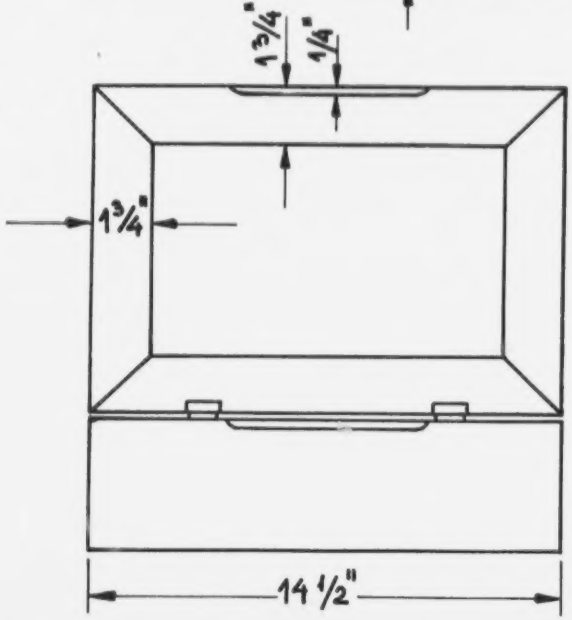
c. Measuring from the bottom of the carcass side, where would you drill holes for the screws that will go through the middle of the runners?

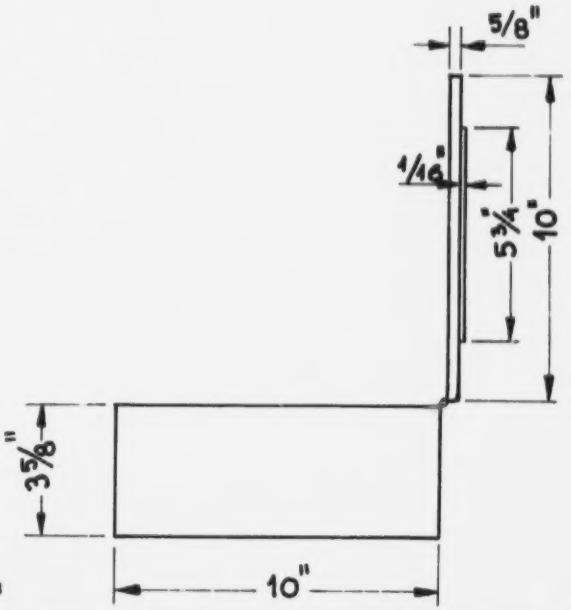
d. Measuring from the bottom of the vertical divider, where will you drill holes for the screws that will go through the middle of the runners?



FRAME AND PANEL BOX
FABRICATION RVTC/CCS
RVTC 1605 CATHARINE ST.
PHILA. PA 19146

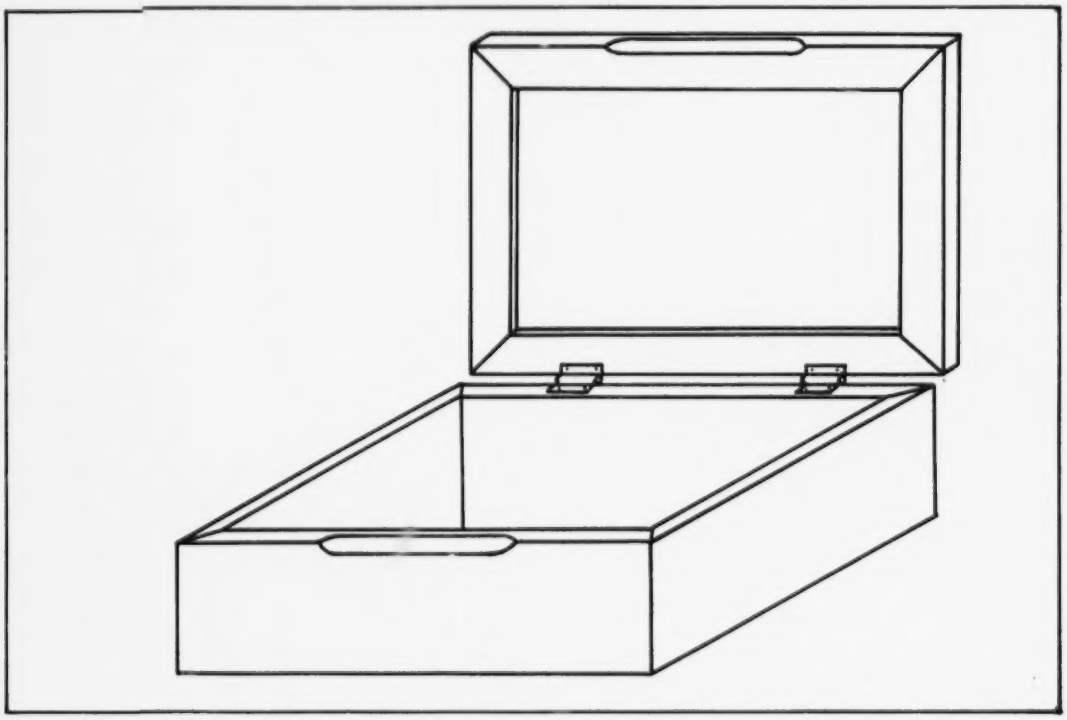






scale 3/16 - 1"

PROJECT III: FRAME AND PANEL BOX



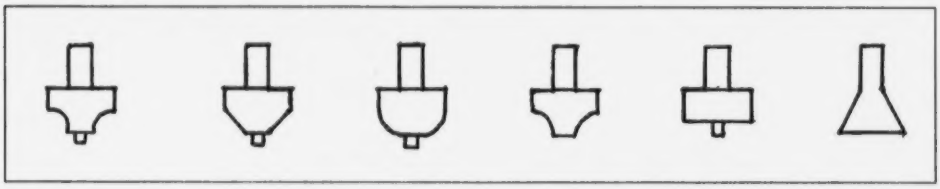
As most of the program's trainees can be expected to be placed in shops which produce large display cabinets and furniture, the projects used for instruction tend to be large, and to utilize the materials most likely to be encountered in the workplace. Smaller projects, such as the frame and panel box illustrated above, serve special purposes: to allow students an opportunity to work independently, to make more personal design decisions, and perhaps most importantly, to take the piece home.

In addition to providing good practice in measurement, alignment and clamping, the frame and panel box gives the students an opportunity to deal with the practical issues of movement, the expansion and contraction of solid stock due to changes in temperature and humidity. (The panel is cut to allow for expansion and contraction in the frame housing.) Exercises and discussion dealing with wood technology are usually presented in the classroom in coordination with this project.

In planning and constructing the boxes, the students are allowed to select their own stock, and to make personal choices regarding shaping and finishing. For practical purposes, the joinery used is chosen by the class as a whole. As stated above in the discussion of the hardware chest project, aesthetic decisions are not likely to be a part of the novice woodworker's responsibilities, but it is important that the trainee be given an opportunity to experiment and that his or her ideas be heard. In one class, for example, a group of Southeast Asian students argued that the joinery of the box should be hidden, as the box would be more valuable if the work did not show. This is in direct contrast to prevailing trends in American and European cabinetmaking, where the appeal of a piece might rest in the deliberate exposure of intricate joints. While it is not clear that such differences in aesthetics might affect a refugee woodworker's performance, it is useful for both the student and the instructor to recognize and appreciate their differences in perspective.

SHAPING WITH A ROUTER

Below is an illustration of 6 router bits and 4 unshaped pieces of stock. Draw the shapes of four different cuts on the blank pieces of stock below. Next to each drawing, write the name of the router bit used.



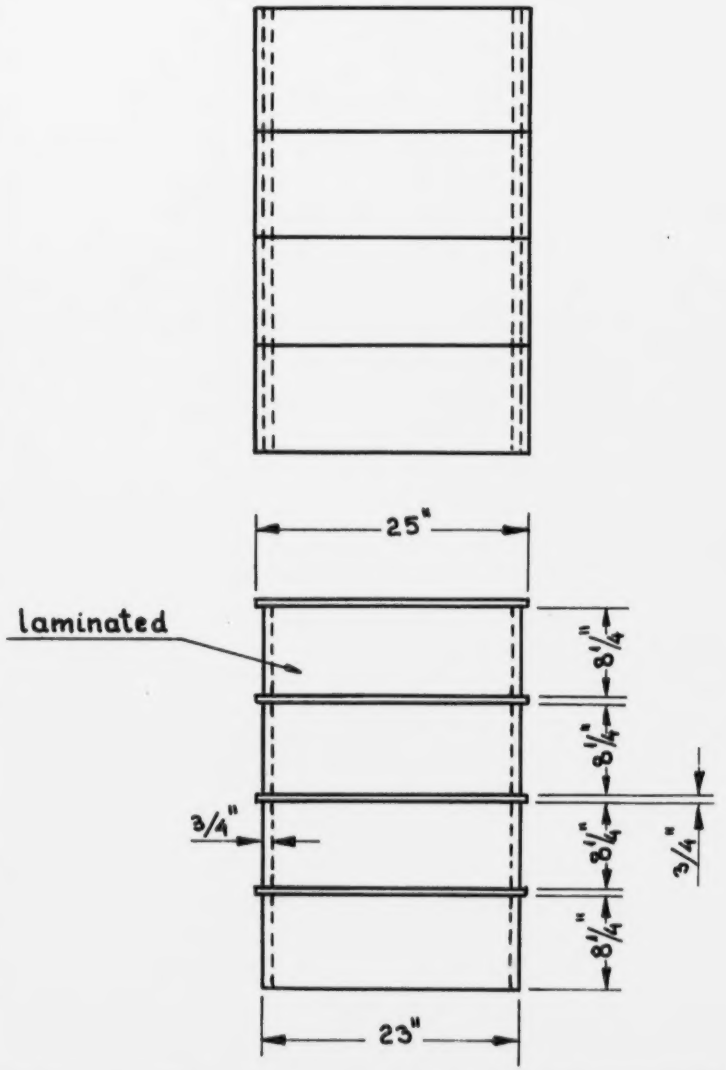
1. _____ 3. _____

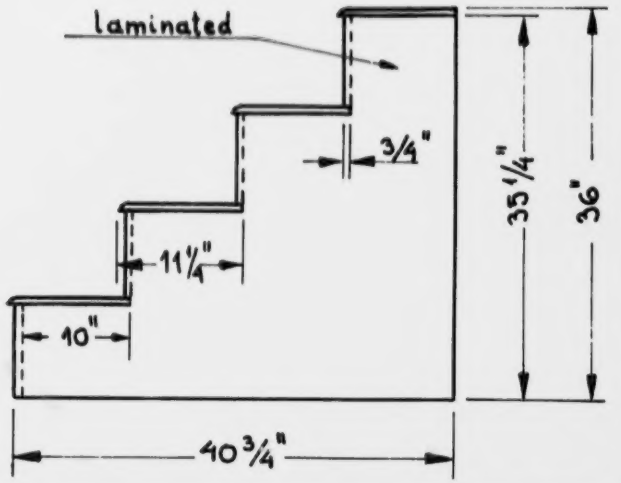
2. _____ 4. _____

a. Which bits are used for cutting joints? How else might you cut these joints without using a router?

b. Which bit do you think was used to shape the lip of the box and edge of the lid of the frame and panel box shown above?

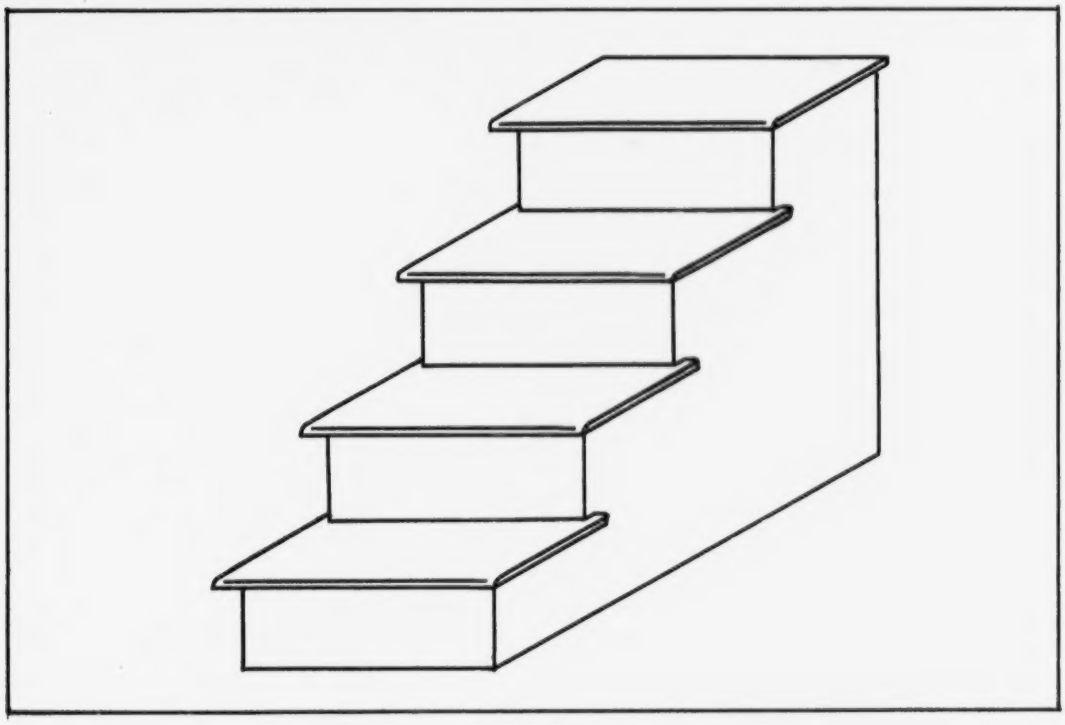
STAIRS
FABRICATION RVTC/CCS
RVTC 1605 CATHARINE ST.
PHILA. PA 19146





scale 1/16 = 1"

PROJECT IV: STAIRS



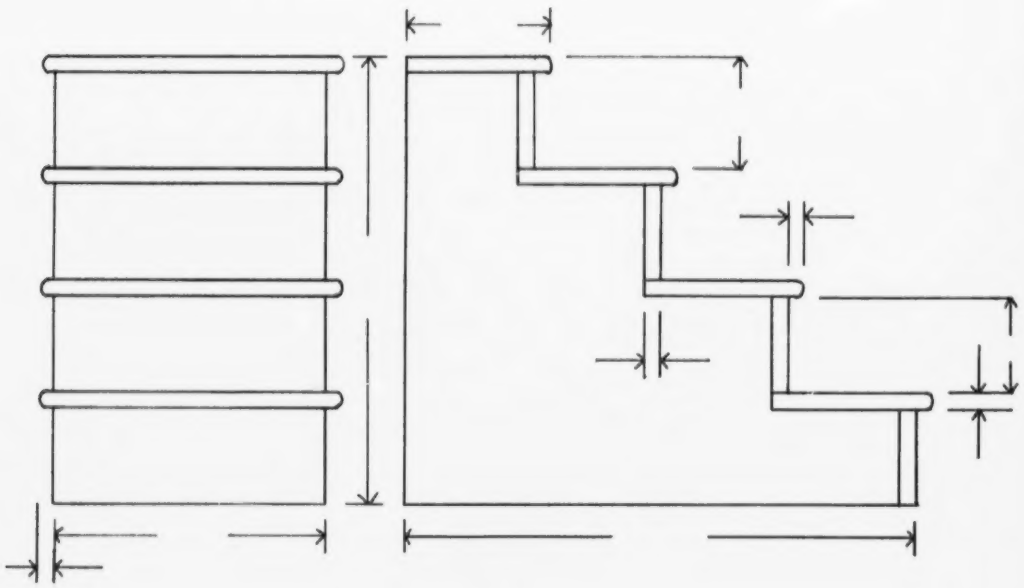
In teaching cabinetmaking it is useful to try to dispel the kinds of ignorance which are most debilitating when working. Primary among these is ignorance of design. If he/she does not understand drawings and the process of design, a cabinetmaker cannot make responsible decisions when problems arise.

While we consider it important to explain project drawings before beginning construction, there is usually little active participation on the part of our refugee students during such discussions. They are clearly uncomfortable at first when asked to talk about cabinets in the abstract. The stairs project has proven to be useful in drawing students into the design process, as it is constructed to fit a specific site and so gives the students an opportunity to consider first-hand the practical problems and requirements faced in building a custom cabinet. Through taking measurements themselves and seeing them translated into a plan, students can begin to understand the structure of a cabinet in light of its function.

MECHANICAL DRAWING: LABELING

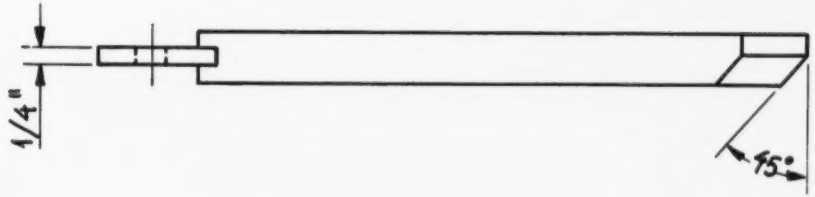
Write the following dimensions in the appropriate spaces on the drawing below. (Drawing is not to scale.)

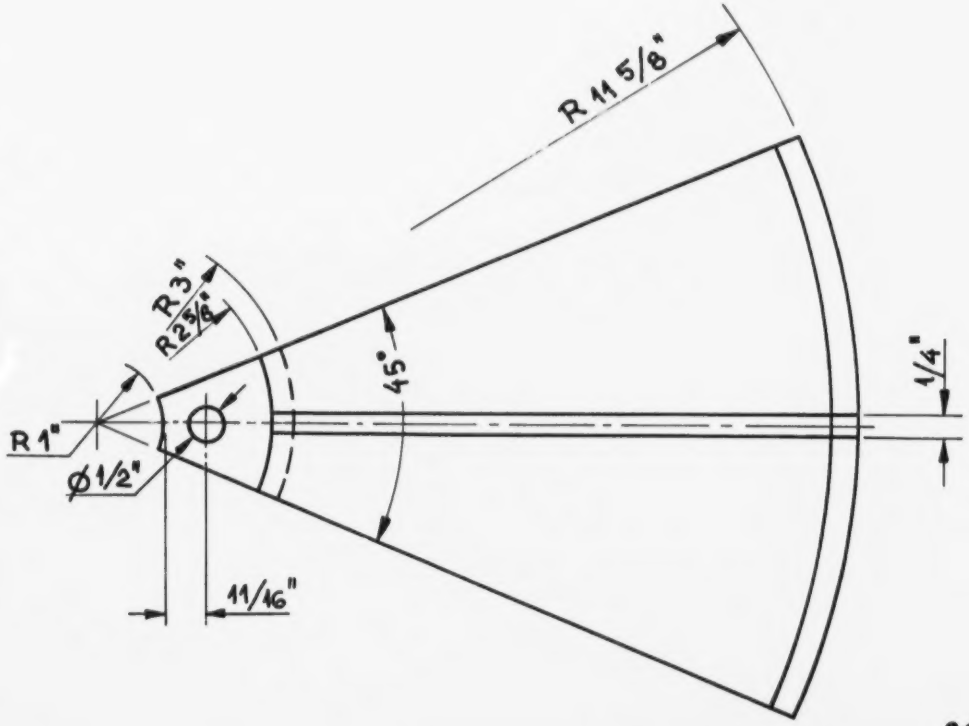
Total run	$45\frac{1}{2}$"	Unit rise	9"
Total rise	36"	Front overhang	$\frac{1}{2}$"
Width of riser	22"	Side overhang	1"
Thickness of riser	$\frac{3}{4}$"	Tread	$9\frac{13}{16}$"
Thickness of tread	$\frac{3}{4}$"		

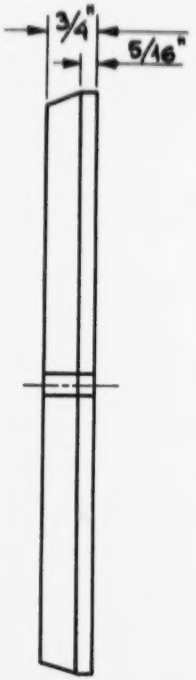


Math problems can be derived from this drawing to further develop the student's ability to interpret mechnical drawings, and to provide additional practice with specialized vocabulary and the addition and subtraction of fractions.

CUTTING BOARD
FABRICATION RVTC/CCS
RVTC 1605 CATHARINE ST.
PHILA. PA 19146

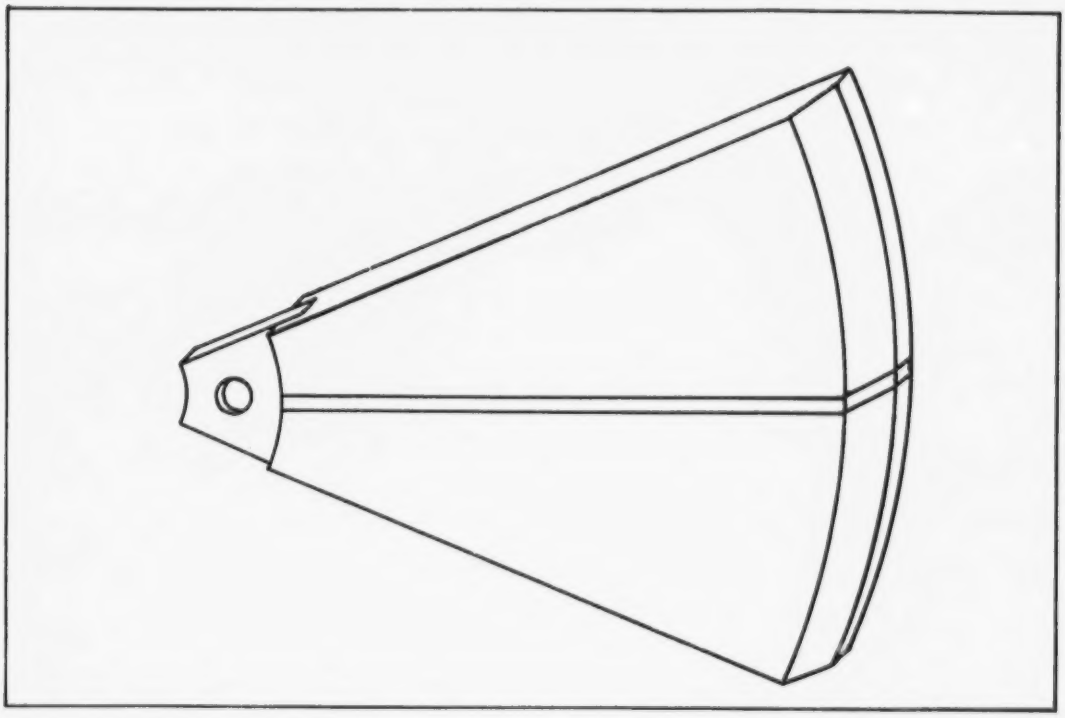






scale 3/8 = 1"

PROJECT V: CUTTING BOARD



Through the cutting board project, students are introduced to aspects of construction not encountered in other shop activities, including: problems in angular measurement for layout, the design and use of plexiglass templates for shaping, the cutting and shaping of brass for the handle, the repairing of surfaces with filler prior to finishing, the mixing of epoxy, etc.

While most of the program's graduates will go on to work with wood, wood products and plastic laminates, it is useful for the student to gain some experience in the cutting and shaping of plastics and metals. Although plastic and metalwork each entail a range of specific techniques appropriate to the materials used and the products produced, there are many shaping and cutting operations which are easily acquired through prior practice with woodworking machinery and tools by changing blades and bits and applying lubrication when necessary. For some students, such practice will serve to enhance their knowledge of materials used in woodworking; for others, it will provide a basis for taking advantage of employment opportunities in other manufacturing and construction trades.

While all of the other projects presented in this manual consist of essentially rectilinear pieces, the shapes of the cutting board and its handle necessitate the measurement of angles and the layout of curves. For refugee students with little background in mathematics, let alone in geometry, this is bound to be difficult. In presenting this material it is assumed that only a few students will understand it fully, and that those who do not will be able to get by without it. Very often students who at first do not seem to understand more difficult concepts in math and mechanical drawing will be inspired to seek explanation from friends, in their own language, and will return to class to participate with heightened interest.

MAKING A CUTTING BOARD

Circle the correct word.

1. GLUE / SCREW / NAIL a strip of cherry between two widths of maple.

2. Using a band saw, form a PLATE / TEMPLATE / PLANE out of plexiglass.

3. Mark the center of the template to assure that the cherry strip will be APPROXIMATELY / EXACTLY / SORT OF in the center of the board.

4. GLUE / SCREW the template on to one side of the board.

5. Using a COPING SAW / TABLE SAW / BAND SAW, cut the board along the template.

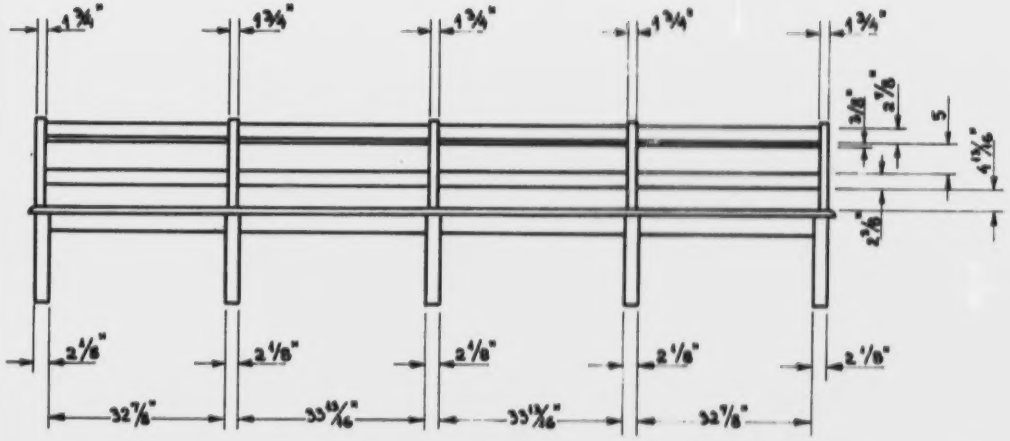
6. Finish rough edges with a DOVETAIL SAW. / ROUTER / BAND SAW

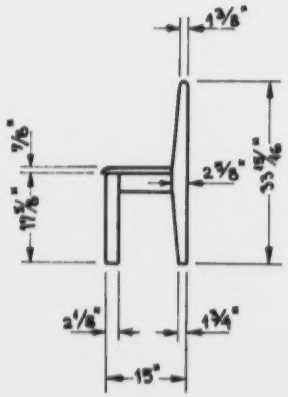
7. Cut a RABBET / DADO / RABBIT into the handle end of the board.

8. Insert the brass handle, which has been MILLED / DRILLED / FILLED, cut, and filed smooth.

54

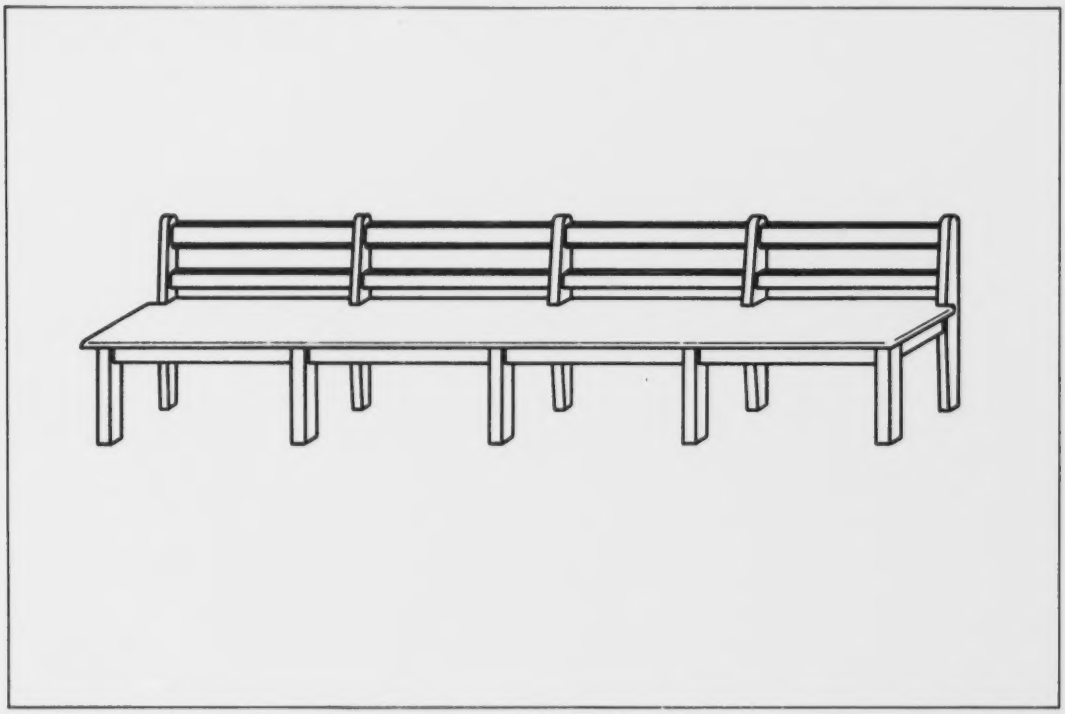
ELLIS ISLAND BENCH
FABRICATION RVTC/CCS
RVTC 1605 CATHARINE ST.
PHILA. PA 19146





scale 1/32 = 1"

PROJECT VI: ELLIS ISLAND BENCHES



The Ellis Island Benches, reproductions created for the Balch Institute for Ethnic Studies in Philadelphia, are simple oak benches, requiring a great deal of basic machining, cutting, shaping, joining and assembly. As such, the construction of one or two benches would constitute a good project for developing essential woodworking techniques. The construction of more than two benches lends itself to a production simulation, as numerous identical parts have to be cut, shaped and joined.

As this project requires the use of considerable amounts of solid stock, it is appropriate here to introduce or review notions in wood technology and inspection of stock, and to discuss the measurement of lumber as it is sold.

The intensive use of power machinery in this project should be reason for review of the hazards of noise in the the shop: the potential for loss of hearing, the decrease in effectiveness in communication, and the dangers of becoming distracted by monotonous noise.

CONSTRUCTION PROCEDURE (BENCHES)

The following lists contain the steps necessary for constructing the Ellis Island Benches, but the steps are given in the wrong order. Next to each step write a number to show its correct place in the order of construction.

Example:

_1_ Set the fence
_3_ Rip stock to width
_2_ Turn on table saw

SKIRTS, SLATS & STRUTS

_____ Shape with router

_____ Rip rough stock to width

_____ Rough-cut to length

_____ Crosscut to exact length

_____ Face-joint

_____ Plane

_____ Edge-joint

_____ Rip to exact width

LEGS

_____ Crosscut front and back legs to exact length

_____ Rough-cut to length

_____ Plane

_____ Face-joint

_____ Taper-cut back legs

_____ Rip again to approximate width

_____ Laminate stock for proper thickness

_____ Rip on table saw to exact width

_____ Rip rough stock to approximate width

_____ Edge-joint

_____ Edge-joint laminated pieces

_____ Shape legs with router

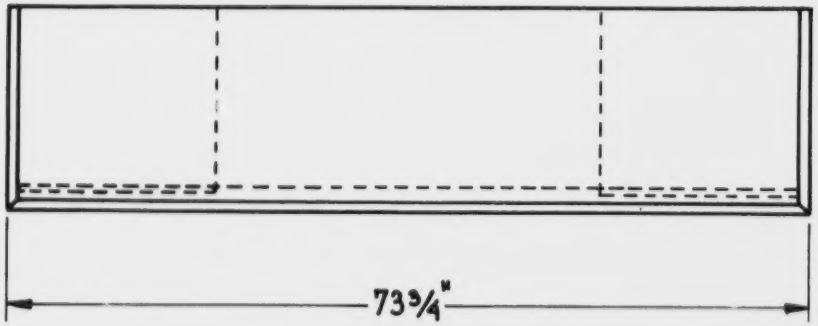
_____ Cut biscuit joints

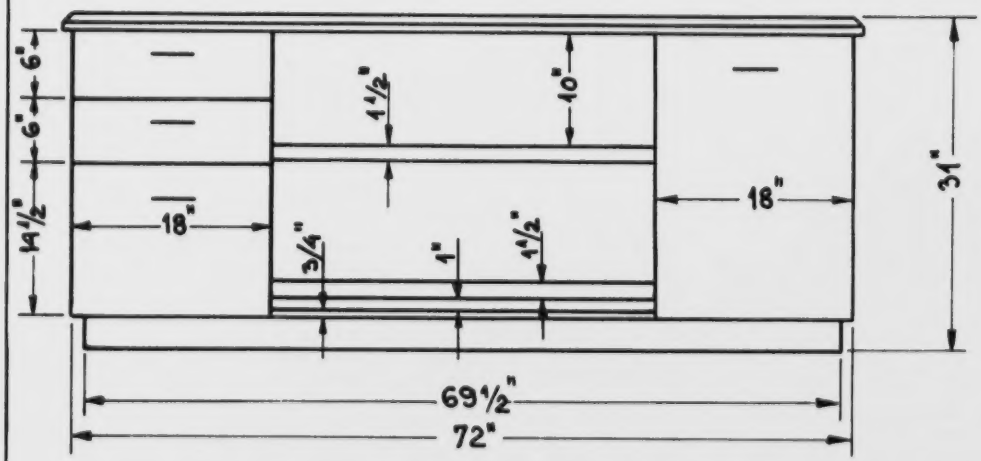
_____ Bore hole in back legs for rod

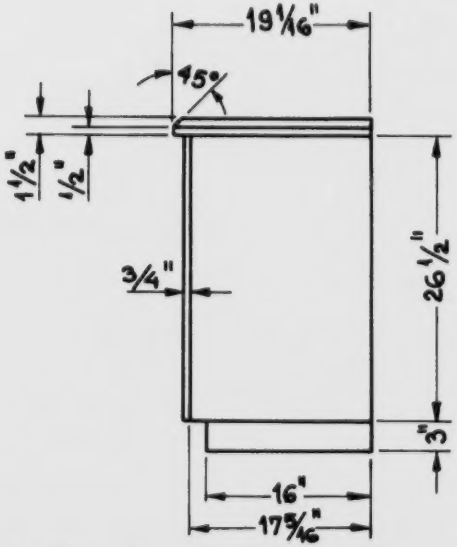
At the end of each project, students should be asked to review the procedures necessary to build the piece they have just completed. This will serve not only to exercise their powers of recall, review vocabulary, and reinforce the acquisition of conceptual skills in woodworking, but it can also serve as a lead-in to verb-tense practice, the study of sentence structure, and in the case of more advanced students, the writing of coherent paragraphs.

It is also recommended that during the daily classroom period students be asked to explain what they have just done in the workshop, and what they expect to do in the next shop period. The exercise presented here can be used not only as an aid in reviewing finished projects, but also as a daily checklist, where the student writes the date next to the operation completed. In this way, the exercise becomes a log of the students' progress in accomplishing tasks and an inventory of techniques learned in the shop.

CREDENZA
FABRICATION RVTC/CCS
RVTC 1605 CATHARINE ST.
PHILA. PA 19146

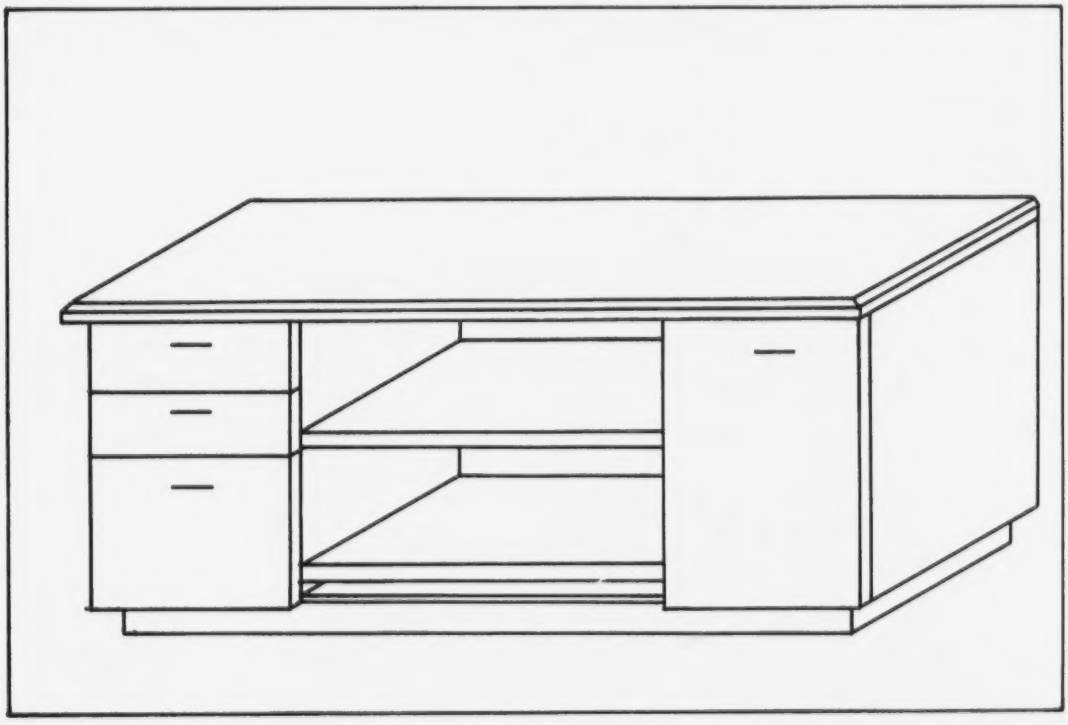






scale 1/16=1"

PROJECT VII: REFUGEE VOCATIONAL TRAINING CENTER CREDENZA



The credenza is representative of the most appropriate type of construction project for training refugee clients for cabinetmaking work in the Delaware Valley. Built largely of particleboard and plywood, and covered with plastic laminate, it provides good examples of the structures and techniques typically utilized by shops producing display and kitchen cabinets. Although the projects built in a particular cycle of instruction should ideally present trainees with a broad range of woodworking experiences, it is recommended that most of the time be devoted to the construction of pieces which most closely approximate those which graduates can be expected to encounter on the job.

To develop especially marketable skills in the trainees, the doors are hung with expensive European-type hinges, and the drawers and sliding shelves below the table top are equipped with high-quality mechanical slides. In addition, hard-wood lipping is constructed and applied to the edge of the table top. If time permits, additional lipping can be applied to the door and drawer fronts. The ability to perform these additional tasks, especially without supervision, can potentially yield greater employment opportunities and higher earnings.

DRAWER CONFIGURATION (CREDENZA)

Solve the following problems, referring to the illustration below. (The illustration is not drawn to scale.)

1. If the drawer front, whose total height is 5", is made up of $^3/_4$" hardwood lipping and laminated flakeboard, what is the height of the flakeboard?

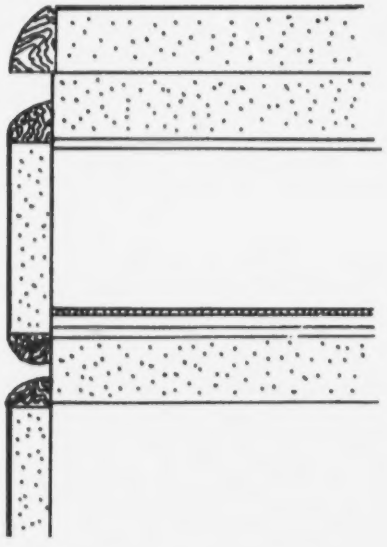
2. Another drawer front is made of 5" laminated flakeboard and edged with $^3/_4$" hardwood lipping.

   a. What are the total dimensions of the drawer front?

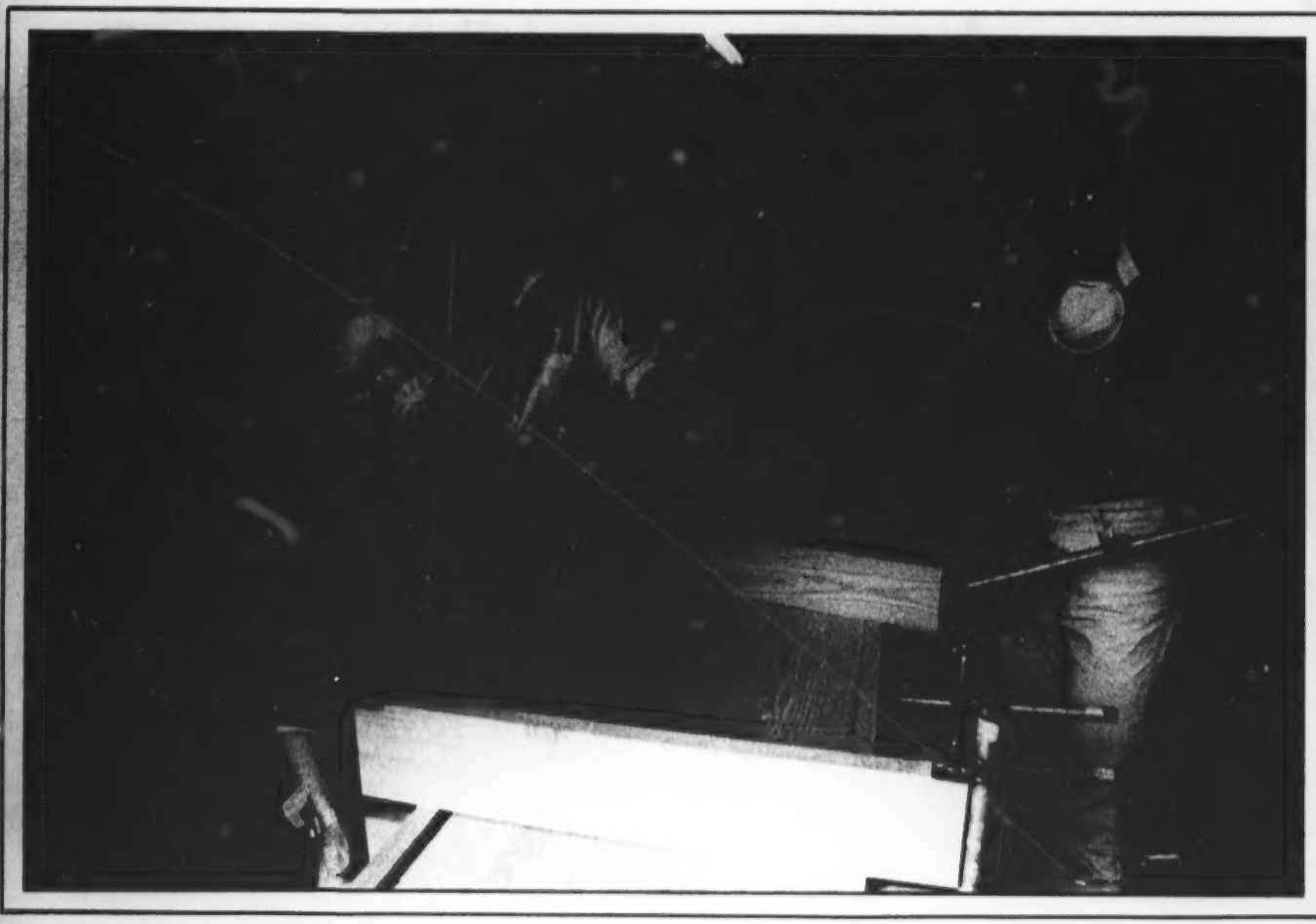
   b. If there is a $^3/_8$" overlap on top and bottom, how high is the drawer opening?

   c. If the sides of the drawers are 4 $^3/_4$" high, and the drawer is hung centered between the stretchers, how much clearance is there between the drawer and stretchers on either the top or bottom?

   d. If a wire pull is to be installed in the center of the drawer front, what is the distance from the edge of the lower lipping to the center of one of the pilot holes?



Part III: Exercises



SAY WHAT YOU MEAN

Here are some words often used in woodworking that are easily mispronounced and confused. Pronounce each set of words, and explain what each word means.

1. sick : thick : six
2. brass : brush
3. biscuit : basket : bucket
4. contract : construct
5. fly : ply
6. why : wide : white
7. wood : foot
8. plus : flush
9. three : tree
10. ash : ass
11. belt : built
12. glue : groove
13. fence : fan
14. shelf : self
15. walk : work
16. lip : leaf
17. live : leave
18. fill : feel

Teaching pronunciation to adults can be extremely frustrating to both teacher and student, and embarassing to students with particularly severe problems in language learning. Pronunciation is often, however, the key to effective communication with Americans, who typically are intolerant of foreign accents. As "survival" courses in English as a Second Language often place little emphasis on pronunciation, we believe that it is useful to give students a second chance in the context of learning new vocabulary. Care is taken to limit the pressure placed upon individuals, and the teacher most often takes advantages of miscommunication situations in the classroom for impromptu pronunciation practice, rather than presenting formal exercises.

The exercise presented here requires that the student explain the meanings of words, as this is the necessary next step in dealing with miscommunication arising from poor pronunciation. LEP workers must always be prepared to answer the question: What do you mean?

MATERIALS, TOOLS AND OPERATIONS

Wood is a **material.**	When you use or make something out of a material, you usually can use it only once.
A saw is a **tool.**	A tool helps you work with materials; when your work is done, you can use the same tool again.
Cutting is an **operation.**	An operation is performed with tools.

*I. Read the following list and write **M** for **material**, **T** for **tool**, or **O** for **operation** next to each:*

1. measuring ____
2. wood ____
3. plastic ____
4. a hammer ____
5. cutting ____
6. metal ____
7. saw ____
8. joining ____
9. a plane ____
10. digging ____

II. Name six tools that you have used:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

III. Write the names of six materials:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

IV. Name four operations a woodworker can do:

1. _____

2. _____

3. _____

4. _____

The first part of this exercise is useful for introducing some simple morphological and grammatical patterns. Words in this list which end in ***-ing*** *are operations, while those used with an article are tools. Number 7 is included as a case of ambiguity: depending upon its use in a particular context, it might represent an operation or a tool.*

The second part of this exercise can be presented as a game: Ask the students to work independently on their lists. Award points as follows: 10 for a unique answer, 5 for an answer shared by 2 students, and 1 for an answer shared by more than 2. This will encourage in some students the development of a wider range of active technical vocabulary.

666

JOB DESCRIPTIONS

Match the job titles in the following list with the most appropriate description below.

Carpenter	Laminator	Finisher
Cabinetmaker	Sander	Carpenter's Helper
Upholsterer	Millworker	Turner
Picture Framer Trainee		Cabinetmaker Apprentice

_____ 1. Covers furniture with fabric. Has knowledge of sewing, colors, matching patterns and fabric types and basic woodworking skills.

_____ 2. Scrapes and sands to prepare wooden surfaces for finishing.

_____ 3. Assists carpenter in preparing wooden parts for construction, using handtools and portable power tools. Knowledge of blueprints not required.

_____ 4. Uses lathe to produce rounded wooden parts for furniture, stairs, etc.

_____ 5. Completes the production of furniture by sanding, scraping, filling cracks and applying various finishes.

_____ 6. Applies and trims plastic laminate using contact cement, spray gun and/or roller, router and files.

_____ 7. Uses solid stock, plywood, laminates and other materials to produce cabinets, office furniture, etc. Sound knowledge of woodworking tools and floor machinery, joinery and finishing. Works from drawings and cutting lists.

_____ 8. Under the supervision of a picture framer, learns to construct frames for pictures using wood, metals, plastics, etc. Possesses excellent measuring skills.

_____ 9. Makes mouldings and parts for doors, windows, and stairs, using large power machinery.

_____ 10. Makes and assembles framing members, roofs, etc. for construction of buildings, using handtools and portable power tools. Works from blueprints.

_____ 11. Under the supervision of experienced cabinetmaker, learns the use of woodworking tools and machinery, and cabinetmaking techniques. Attends regular classes during work, and earns pay increases gradually over long training period.

*There is often much confusion among students regarding the different positions available in **woodworking**, the skills required of each, and the levels of expertise expected. In addition to being useful for introducing these notions, this exercise is an ideal means for assessing the experience and identifying the expectations of individual students in regard to their training and job prospects. We suggest that the teacher ask the students to define **woodworking** as they know it from previous experience, prior to using this exercise.*

ODD MAN OUT

Underline the word (or picture) which does not belong in the group. Explain your choice.

1. ebony, rosewood, pine, teak, zebrawood
2. metal, plastic laminate, solid stock, glue, plywood
3 strength, width, length, thickness, height
4 goggles, ear plugs, staple gun, dust mask, respirator
5. Welcome, Caution, Warning, Danger!, Flammable
6. splinter, cut, headache, lunch break, shock
7. frog, dog, rabbet, elephant, horse
8. bar, pipe, "C", winter, spring, "F"
9. carpenter, cabinetmaker, mason, framer
10.

*Odd Man Out is an excellent exercise for encouraging classroom discussion, giving students an opportunity to express and defend opinions. Sets can have a single answer, as in No. 1 above (**pine** is a domestic softwood, while the others are exotic hardwoods). Alternately, more than one answer may be correct. In No. 7, for example, **elephant** is the only term not used in woodworking, while **rabbet** would be a misspelling if the set of terms were taken to be a list of animals (a **rabbet** is a groove cut into the edge of a piece of stock). In No. 5, **Welcome** is clearly not a warning, while **Danger!** is unique in having an exclamation point.*

ODD MAN OUT (MORPHOLOGY)

Circle the word which does not belong to the set. Explain why.

1. length, width, depth, strength, thickness
2. router, planer, jointer, plane, sander
3. cut, planed, smoothed, finished, shaped
4. carpenter, finsher, electrician, cabinetmaker, assembler
5. circular, triangular, square, singular, rectangular
6. strengthen, open, harden, soften, fasten
7. reinforce, reproduce, redo, refinish, reduce
8. impossible, inflammable, imprecise, immature, impenetrable

For some of the sets of words given here there may be alternative solutions not based upon word morphology.

Khmer is the only Southeast Asian (refugee) language which employs morphological affixation comparable to English. There are, however, no suffixes in Khmer.

None of the Asian refugee languages have word-final consonant clusters or phonological word-final /s/ or /r/. This accounts for the difficulty that many students have in hearing and producing the sounds at the ends of English words in general, and the suffixes in particular. Because of this, pronunciation and grammatical errors are at times extremely difficult to sort out.

CONFUSING TERMS

Match the words on the left with their definitions on the right.

1. joiner	a. glued together
2. join	b. a handtool
3. joint	c. woodworker
4. jointer	d. to put together by fastening, shaping or gluing
5. plane	e. plastic or metal glued to another surface
6. planer	f. to plane a face and edge straight and true
7. laminate	g. a person who does lamination
8. laminated	h. a stationary power tool used to make opposite sides of stock parallel
9. laminator	i. a machine for planing faces and edges straight and true

This exercise is useful not only as a means for getting at the differences between words of similar form, but also as a lead-in to discussion of general and context-specific meanings and apparent inconsistencies in usage.

*Inconsistency in spelling (joiner vs. laminator) and the derivation of words (**joiner** - a person who joins wood vs. **planer** - a machine which planes wood; **joint** - a connection vs. **jointer** - a machine which planes stock faces true) are familiar problems to all students of English. In some domains of vocabulary, there may be additional sources of confusion, arising from specialized usage. Lamination, for example, is a kind of joining, but one would not usually refer to the bond between flakeboard and formica® as a joint. On the other hand, the lamination of two pieces of solid stock along their edges is usually called joining, with the bond referred to as an edge-butt joint. Here, context determines the range of usage of various technical terms. Similarly, in describing the mechanical operation of the planer and the jointer, it is necessary to say that they both plane; the function of each, however, is different. For the student attempting to acquire new technical vocabulary, the necessary sorting out of terms which have both general and context-specific meanings can be especially difficult. Discussion of usage problems such as these can be useful to both the student and the instructor in identifying areas of actual or potential misunderstanding.*

WHAT IS IT?

The following sentences contain names of furniture you may not know. Read each sentence and try to figure out where you might find the piece of furniture and what it is used for.

1. The old dog lay on the porch near Grandpa, slouched asleep in his *rocker.*

2. Mrs. Peterbuilt freshened her makeup at the *vanity* and then returned to her guests downstairs.

3. Ezra took out his dentures, dropped them into a glass of water on the *nightstand,* and lay back.

4. Estelle kept her *secretary* locked because the letters inside were private.

5. I wish my *bureau* drawers were lined with cedar instead of laminated particleboard.

6. Edwin slept in the lower *bunk* because he was afraid of heights.

7. Every day Gertrude dusted Great Grandma's china, which she kept in the *hutch.*

8. Armand, the headwaiter at La Place, opened the *drop-leaf* and set it for a party of six.

9. Her parents bought a *convertible sofa* for weekend guests. It's very convenient except that you have to move the marble-top *coffee table* to make the bed.

This is a difficult exercise, intended for students with advanced reading skills.

PARTS AND WHOLES

Name the object composed of the parts listed below.

Example: trunk, limb, twig, root, bark *tree*

1. base, collet, trigger, bit
2. blade, fence, guard, outfeed table, dado head, crosscut jig
3. sole, frog, handle, blade
4. grain, knot, check, rot
5. infeed table, outfeed table, cutter head, fence, guard

SUPPLY REQUESTS

When you buy supplies such as stock, sheet goods, adhesives, tools, etc., they usually come in standard measurements, packages or containers. Use the following words to fill in the blanks in the sentences below:

can, board foot, sleeve, bottle, barrel, box, sheet

1. We need 10 one-pound _____ of $^3/_4$" flat-head screws.
2. There are 2 ten-gallon _____ of contact cement outside.
3. This shipment of walnut contains about 500 _____.
4. I'll need another _____ of carpenter's glue.
5. How many _____ of formica® have we used?

6. There are 5 _____ of Watco® oil left in the supply room.

7. Pick up a _____ of 80-grit sandpaper, would you?

8. We just received an order of 8 _____ of lauan ply.

9. How many _____ of porch paint do you want?

10. Can you find the _____ of finishing nails?

In the workshop requests for supplies may not be specific. Using the following words and phrases, fill in the blanks below:

handful, bunch, few, load, several, some, lot , little bit, couple

1. Before we start another project, we need another _____ of lumber.

2. How many screws do you want? Not many. Just a _____.

3. I've got just two more to do. Hand me a _____ of hinges.

4. Hey, grab me a _____ of biscuits, o.k?

5. Is that enough glue? Almost. Put on a _____ more.

6. You'll need _____ more oil for that table top.

OPPOSITES

Match the words to the left with the words of opposite meaning on the right.

horizontal	1	a.	curved
clockwise	2	b.	rough
short	3	c	even
odd	4	d.	long
parallel	5	e.	separate
straight	6	f.	counterclockwise
top	7	g.	intersecting
add	8	h.	light
thick	9	i.	bottom
perfect	10	j.	bendable
rigid	11	k.	subtract
smooth	12	l.	thin
heavy	13	m.	uneven
join	14	n.	flawed
flush	15	o.	vertical

DIMENSIONAL ADJECTIVES AND NOUNS

Fill in the blanks with the appropriate words.

thick	thickness
deep	depth
high	height
long	length
wide	width

1. To get stock the same _____ we usually plane it.
2. I prefer seat-backs that are _____ enough to rest my head against.
3. The stock for the treads is very _____ because there will be a lot of wear and tear on the stairs.
4. The radial arm saw is used to cut stock to _____.
5. The doorway is not _____ enough to get the desk through.
6. What's the _____ of the table from floor to top?
7. The drawers were made _____ so you could stand files in them.
8. The shelves for the room divider are 15 feet _____.
9. The maximum _____ of the jointer's feed tables is eight inches.
10. I don't know what the greatest _____ of the Atlantic Ocean is, but it's thousands of fathoms.

SHAPING WORDS IN WOODWORKING

Find the missing words and fill in the spaces in the following chart. Then supply the correct word to complete the sentences in the exercise below.

Dimensions

Noun	Adjective	Verb
length	_____	lengthen
_____	deep	deepen
_____	_____	heighten
thickness	_____	_____

Geometric Shapes

Noun	Adjective	Verb
square	_____	square (up)
circle	circular	xxx
triangle	_____	xxx
_____	rectangular	xxx
_____	curved	curve
arc	_____	xxx

The chart can be filled in based upon in-class discussion or as a dictionary exercise done for homework. In-class review of the morpological patterns (e.g. circle/circular) found in the chart can lead into more general discussion of word formation in English.

Students should be encouraged to discuss the range of possible answers to each of the fill-in questions.

Woodworking Shapes

Noun	Adjective	Verb
bevel	_____	bevel
_____	chamfered	_____
taper	_____	_____
_____	coved	xxx
roundover	_____	round over
_____	bullnosed	_____
_____	_____	miter
dado	_____	_____
_____	rabbeted	_____
mortise	_____	_____
groove	_____	_____

Fill in the blanks. There may be more than one right answer for each question.

1. What's the _____ of the table? It's 5 feet _____.
2. The moon isn't square, it's _____.
3. I guess most tables are _____ in shape.
4. The river is so shallow that the city is going to try to_____ it.
5. I think you should _____ the edge of the table so it won't be so sharp.
6. The corners of the picture frame have to be _____.
7. No, the clock has three sides; it's _____.

THE FOREST AND THE TREES

Underline the word or phrase that refers in general to all the others in the set.

1. oak, walnut, solid stock, mahogany, lauan
2. tongue & groove, joint, dado, rabbet, mortise & tenon
3. respirator, goggles, dust mask, safety equipment
4. flawed, checked, rotted, warped
5. width, thickness, dimension, length, height
6. circular, rectangular, triangular, square, shape
7. screw, bolt, finishing nail, fastener, brad
8. adhesive, epoxy, contact cement, plastic resin
9. steel wool, sandpaper, pumice, abrasive
10. finish, lacquer, shellac, linseed oil, varnish
11. inch, linear measurement, foot, yard, mile
12. ruler, steel tape, measuring tool, caliper
13. band saw, table saw, jointer, floor machinery
14. palm sander, power tool, drill, router, saber saw
15. plane, ripsaw, chisel, handtool, scraper

Make sentences explaining what each of the following is.

Example: smoothing plane
A smoothing plane is a kind of handtool.
A smoothing plane is a type of handtool.

1. walnut
2. lumber core
3. dust mask
4. square
5. contact cement
6. warp
7. screw
8. oil
9. caliper
10. router
11. band saw
12. brass
13. countersink
14. steel wool

The ability to describe an object without naming it (circumlocution) is important to anyone faced with learning and mastering hundreds of new vocabulary items. Activities such as "twenty-questions" are useful for developing the student's ability to describe an item in terms of its use, physical characteristics, similarity to or membership in a general class of objects.

TOOL PREFERENCES

Match each operation with an appropriate tool and make sentences for each using the patterns given below.

Tools:

radial arm saw	drill press	jointer	router
band saw	table saw	sander	planer

Operations:

1. cut a triangular template
2. make a groove
3. make a rough cut
4. make one edge and one face square and flat
5. get several pieces of stock to the same thickness
6. crosscut rough stock
7. make a chamfer
8. smooth out a curved surface
9. crosscut or rip stock which is already jointed
10. drill a hole

Sentence patterns:

You can _____ on the _____.
I would use a _____to _____.
A _____ can be used to _____.

There is more than one answer to most of the matching exercises above. Encourage the students to explain their individual preferences for using particular tools.

HAVE YOU EVER?

*Make questions using the phrase "*Have you ever..."

Example: build a house
Have you ever built a house?

1. use a tape measure
2. do factory work
3. read a cut list
4. see a redwood tree
5. drive a truck
6. study woodworking
7. hurt yourself while working
8. be to California
9. take public transportation
10. work from blueprints
11. file an application
12. cut plastic laminate on a table saw

This exercise combines practice in forming questions and using the correct past participle form of common verbs. Unlike English, the Southeast Asian (refugee) languages do not make use of morphological markers of tense; tense is indicated either through context or temporal adverbs and particles, similar to the use of "will" in forming the future in English.

As the questions formed here are likely to be heard in a job counseling or interview situation, this exercise might be used as a lead-in to mock interview practice.

YOU USE...

Make sentences that explain what tool is used for each operation given below.

Example: —to write
You use a pen to write with.

1. —to measure stock
2. —to test for squareness
3. —to cut a curve
4. —to pare wood
5. —to drill a hole
6. —to drive a screw
7. —to hold material while working with it
8. —to shape wood
9. —to lay out an angle
10. —to reduce the thickness of stock
11. —to prepare an edge for joining
12. —to cut a tenon

Although the use of impersonal pronouns is familiar to refugee students from their own languages, there is often some confusion about the use of "you" as both a personal and impersonal pronoun in English.

The use of "with" at the end of some of these sentences, while not strictly grammatical, is common and accepted in everyday spoken English. We consider it worthwhile teaching English as it is spoken, as this is most appropriate to the practical needs of the students.

SENTENCE AND PARAGRAPH STRUCTURE

The scrambled sentences below give simple instructions for assembling and finishing hardwood workbench tops.

Put the groups of words in order to make correct sentences. Add the words ***the, a,*** *and* **an**, *where necessary.*

Then, try to use words like ***first, next, then, finally,*** *etc. in these sentences to make the order of procedure more clear.*

Example: glue, grooves, splines, spread, in, and, on

Spread glue on the splines and in the grooves.

1. grooves, spread, on, in, glue, and, white, splines

2. grooves, splines, into, insert

3. clamps, check, put on, squareness, for, and

4. set, allow, to, glue

5. off, glue, dried, scrape, scraper, paint

6. surface, clean up, oil, before, apply, you

7. finished, rags, to, when, oily, dispose of, you're, remember, carefully

OBJECTS AND OPERATIONS

Name the operation(s) performed with the tools and materials given in each set.

Example:

knife
fork
spoon

They're used for eating.
They're used to eat with.

contact cement	router
dowels	flush-trim bit
J-roller	respirator

_____

_____

drill press
forstener bit
hinge
screws

_____

_____

marking gauge
dovetail saw
chisel
mallet

_____

_____

jointer
planer
table saw
square

_____

_____

sandpaper
steel wool
rags
oil

_____

_____

85

SAFETY SIGNS

Read each of the signs and warnings below. Where would you see them? What are you supposed to do, or not do, when you see them?

Make sentences using the following words:
must (not) , have to, should (not), (not) allowed to, (not) supposed to

Example: HARD HAT AREA
You're supposed to wear a hard hat on the construction site.

1. DON'T WALK
2. TURN OFF GAS BEFORE USE
3. NO SMOKING
4. DO NOT ENTER
5. WEAR GOGGLES WHEN HANDLING
6. WIPE UP SPILLS
7. KEEP AWAY FROM FLAME AND HEAT
8. KEEP RIGHT
9. THINK
10. READ INSTRUCTIONS BEFORE USING

WHAT NEEDS TO BE DONE

The situations on the next page contain problems a woodworker must solve. Read each passage and decide what needs to be done. Make sentences based on the example, using the words below.

Example: The floor is covered with sawdust and shavings.
The floor *needs to be swept.*

adjust	sharpen	refinish
recut	tighten	hand plane
relaminate	square	rip
crosscut	flush trim	lower
set	raise	shim
fill	draw to scale	match

1. A board is 5" wide, and you need a board that is only 3 $^1/_4$" wide.

2. Water has gotten between the formica® and flakeboard, so the formica® is not adhering.

3. Clamps that are holding a glued joint together are too loose.

4. The shellac that you applied to a box turned the wood a strange color that no one likes.

5 There are mill marks, like ripples, on the surface of a board.

6. The plastic laminate is larger than the surface it is laminated on.

7. The door you hung with adjustable hinges is not straight.

8. The blade of the plane is dull.

9. A board is several inches too long.

10. The mortise is slightly larger than the tenon.

11. The table saw blade is too high for cutting the stock.

12. You want to rip stock on the table saw to 6 $^1/_2$".

13. The fence of the jointer is at an oblique angle to the jointer.

14. You are using a router to cut a rabbet joint, but the bit is cutting too deeply.

15. You screwed a template to the surface of the stock in order to cut a perfect curve. When you remove the template, there are holes in the stock's surface.

16. You drew a picture of a piece of furniture you want to reproduce, but in your drawing the carcass is too high, the door too wide, and the kick too deep.

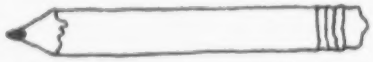
87

WHAT'S GONNA HAPPEN?

*Make sentences explaining what operation will be done with each of the tools or materials shown below, using the phrase "*be going to*" and the following words:*

apply	clamp	pare
plane	trim	take a (coffee) break
cut	shape	test for
laminate	drill	chop

Example:



He's going to lay out the tenons.

If available, realia should be used in this type of exercise instead of drawings.

Students often have problems with spoken forms such as "gonna" for "going to," and are usually interested in knowing about their use. The use of reduced forms will be especially familiar to speakers of Khmer, as many Khmer words have full/formal and reduced/spoken variants.

COMPARATIVES

Make sentences comparing the terms on the left using the adjectives on the right.

Example: lemon/orange sweet
An orange is sweeter than a lemon.

1.	oak/poplar	hard
2.	white glue/contact cement	dangerous
3.	hand drill/electric drill	fast
4.	sapwood/heartwood	dark
5.	solid stock/flakeboard	expensive
6.	$^1/_2$" / $^1/_4$"	large
7.	aluminum/brass	heavy
8.	cabinetmaking/rough carpentry	detailed

CONSTRUCTING SENTENCES

Make sentences from the following groups of words. You may have to add forms of the verbs ***be*** *or* ***do*** *to complete the sentences.*

Example: George, a book, writing, Vietnam, about
George is writing a book about Vietnam.

1. mother, city, living, in, another, his

2. forms, hates, Solomon, filling out

3. John, taxes, paying, not, like

4. woodworking, finished, Jan, studying, week, last

5. sleeping, when, called, Kiet, Phuong

6. visiting, Phoeun, family, month, his, next

7. learning, learning, difficult, English, than, fractions, more

8. overtime, they, want, not, to, work

9. park, lunch, the, eating, Joua, in

10. better, looking, Keo, job, for, a

SENTENCE STRUCTURE AND ORDERING

The scrambled sentences below are instructions for preparing stock to be cut to size on the table saw.

Put the words in the correct order to make sentences.

Then, put the sentences in the correct order to make a paragraph.

1. width, correct, table saw, then, on, cut, to, the, the

2. rip, band saw, first, on, the, stock, the

3. thickness, plane, planer, then, required, on, to, the, the

4. length, rough cut, radial arm saw, stock, next, with, to, the, the

5. stock, jointer, then, face joint, on, the, the

6. then, jointer, edge joint, stock, on, the, the

7. crosscut jig, length, finally, cross cut, correct, to, with, the, the

IDENTIFYING MATERIALS

Find the samples of plastic laminate which meet the specifications given in the chart below.

Order #	Color	Finish	Texture
001	light blue	matte	smooth
002	dark blue	gloss	double brushed
003	gold	metallic	smooth
004	dark green	gloss	smooth
005	dark blue	n/a	disc
006	copper	metallic	hammered
007	light blue	gloss	smooth
008	black	n/a	disc

Plastic laminate samples can be obtained from laminate suppliers.

This exercise requires an understanding of the various concepts and types of color, finish and texture. Knowledge of color, in particular, is important in the context of lamination and finishing work for the proper identification of materials. It is also crucial to the understanding and use of color-coded sorting and classification systems, where color may figure in the coding of work orders or in the marking of materials which are otherwise difficult to distinguish visually.

Using English color terms can be particularly difficult for speakers of Southeast Asian refugee languages. In Khmer, for example, there are frequently used, non-specific words for warm (reds, oranges, yellows, browns, etc.) and cool (blues, greens, purples, etc.) colors. When necessary, specific terms are available to name particular colors, but in general, the two basic color words suffice. Khmer students of English often have difficulty with the red-orange and blue-green ranges, where they tend to use English color terms in a non-specific way. Thus, ***blue*** *might be used to refer to something which most English speakers would call* ***green****.*

COMPARISON OF ORIENTATION AND SHAPE

Look at the pairs of drawings below and explain how the objects are similar and how they are different.

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

This exercise is especially useful for encouraging students to develop their abilities in description and comparison. Here the focus is upon the recognition and characterization of differences in orientation and shape—perceptual and linguistic skills which are essential to the development of technical precision, problem-solving ability, and effective communication at work.

For students with more advanced verbal skills and ability to work independently, the class can be broken down into pairs, with each student given either the left or right column of the page. Using just verbal communication, the pairs should decide if they have the same or different sets of drawings.

SAFETY EQUIPMENT

Anwer the questions below, using the following list of safety equipment:

safety glasses	respirator
goggles	ear protectors
gloves	table saw guard
dust mask	(floor) treads

1. What part or parts of the body does each of the above protect?

2. What does each kind of equipment protect you from?

3. What would you do if you were asked to work without the following:

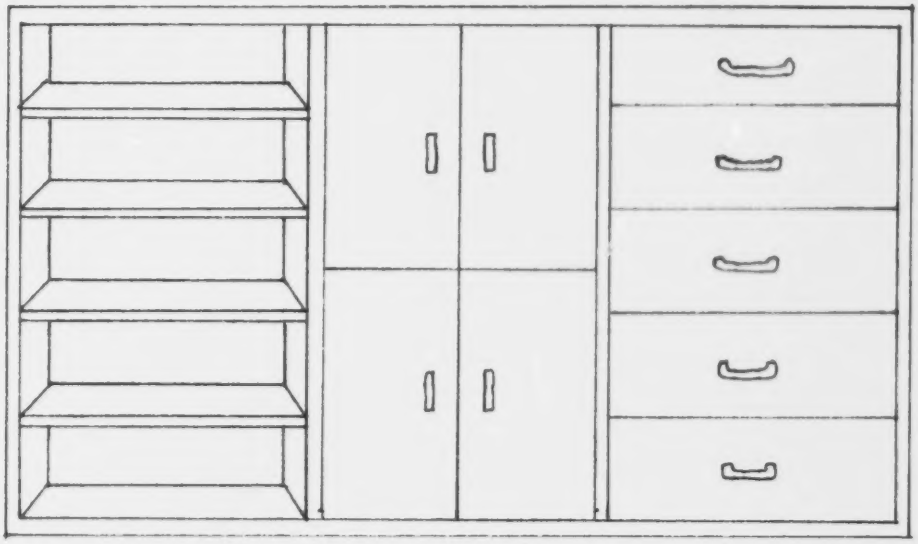
safety glasses	table saw guard
respirator	ear plugs

4. When must you operate a table saw without a guard?

These questions are intended to lead into discussions of personal safety and workers' rights.

DESCRIBING LOCATION

Carefully follow the instructions given by your teacher, using the drawing below.



This is an ideal exercise for developing skills in prepositional usage, spelling of technical vocabulary, following directions and asking for clarification.

Students are shown a variety of tools and materials, one at a time, and asked to write the name of the object shown in a particular location in the storage cabinet. For example, a drill index is shown, and they are directed to write its name "in the second drawer from the top" or "on the lowest shelf." When the cabinet is ""full," the objects should be presented again, and students should be able to name them and identify their locations according to their own labeled diagrams.

As a variation, a situation might be presented (e.g. a table has to be laminated), and the students have to direct eachother in finding the appropriate equipment and materials in the "full" cabinet. For example, to laminate the table, a student will need contact cement, a respirator, a paint roller, dowels, a J-roller, a file, a router, bits, etc. Student A asks for the file. Student B looks at his or her diagram, locates the file, and directs student A to look there. If both students have placed the name of the object correctly, then student A will be successful. If one or both students have placed the label in the wrong position, they will have to "ask around" to find the correct location.

TELEPHONE EXERCISE I

Make a phone call according to the instructions you have received from your teacher. Answer all questions and follow all directions given to you during the call, using the form below.

1 Place a check in the correct box: ☐ Yes ☐ No	2	3 Are you currently employed? Yes No
4	5	6
7	8	9 3:15 AM 2:30 PM 2:45 PM

Many non-native speakers of English find the use of the telephone to be an especially difficult communication skill to master. Without the visual cues of expression and mouth movement, words which normally fall within a student's vocabulary may be rendered unintelligible. The use of the telephone is essential to mastering independent job-search skills and to job retention, however, and thus should be included as part of a complete employment-focused skills development curriculum. The goals of the phone exercises presented here are to encourage the student to develop personal approaches to problem-solving using the phone, and to give the student practice in directing the flow of conversation to keep questions and answers within his or her range of vocabulary and comprehension skills. Through repetition and variation, such exercises can serve to develop in the non-native English speaker greater and greater independence and ease in the use of the telephone.

Note that for each of these exercises, telephoning is done individually; students should have some written work to do independently while waiting for their turns.

This exercise should be conducted near the beginning of the course as an introduction to the use of the telephone for gathering information. From class discussion, the teacher should be able to assess in general each student's confidence in and familiarity with speaking on the phone in English. As the emphasis of this activity is on listening (rather than on active verbal response) and the student's attention is likely to be focused upon the answer sheet, this exercise takes on a game-like quality which makes it relatively non-threatening.

Students should be introduced to the subject of using the telephone as a group. Included in such orientation should be basic information regarding etiquette, and particularly the formulas commonly used for starting, maintaining and completing a conversation. As preparation for this exercise, it may also be useful to review some of the vocabulary which will be used in the directions given to the students over the phone. It is essential that the students also review the ways in which one can ask for repetition and clarification.

The student is given the (fictitious) name of the party to be called, and the number of a phone at which the teacher will receive the call. The student should make the call in private, using the answer sheet to record his or her answers.

Once the student has identified him/herself, the teacher gives the instructions on the next page.

Please follow my directions and answer my questions on your answer sheet.

Write your name in the middle box.

Circle the correct answer to question number 3.

In the bottom right-hand box, circle the answer which says "quarter of three in the afternoon."

Write your telephone number in box number 4.

Do you own a car? Check the answer (yes or no) in the top left-hand box.

In box number 8, write the time I say. *Use different times and time expressions for each student, e.g. "ten of eleven," "ten fifty," "five after nine," "nine-o-five," etc.*

In the bottom left-hand box, write the name: Rogers Industries.

Write today's date in box number 2.

Do you live in Philadelphia? Write your answer (yes or no) in box number 6.

If there is something written in each of the boxes, then you have finished.

When all students have completed their calls, the class as a whole should discuss their answers and especially their problems in understanding and/or recording the information requested. The teacher should cite any good approaches to information gathering demonstrated by individual students, and make suggestions for improvements in telephone etiquette where necessary.

BUS OR SUBWAY?

Read the following information and then answer the questions below.

You must get to work by 8:30 a.m.

You can take the #20 bus downtown, and transfer to the #8A to get to work, or you can take the D train (subway) to City Station and transfer to the C train.

#20 BUS		#8A BUS		D TRAIN		C TRAIN	
Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.
6:35	7:10	7:45	8:10	7:20	7:40	7:12	7:27
6:55	7:30	8:00	8:25	7:45	8:05	7:32	7:47
7:15	7:50	8:15	8:40	8:10	8:30	8:12	8:27
7:35	8:10	8:30	8:55				
7:55	8:30						

1. Which #20 must you catch from your home to take the 8:00 #8A to work?

2. If you take the 7:20 D, what time will you arrive at City Station?

3. If you take the 7:20 D, which bus or train can you take to work?

4. In your opinion, is the 6:35 #20 the best bus to take?

5. What is the latest train that you can take from home and still get to work on time?

6. If you catch the 6:55 #20, what time will you arrive at work? Do you think this is a good way to get there on time?

7. What do you think is the best way to get to work?

8. If the weather is bad, what do you think is the best way to commute?

9. If one day you must take the 8:10 D to City Station, what time will you get to work? What should you do if this happens?

10. If there were a transit strike, what would you do to get to work?

WHAT'S THE QUESTION?

Read the following statements and guess what question the person asked to receive such an answer.

Example: No, no. I said one and a half inches thick.
Is this supposed to be only one half inch thick?

1. $3.35 an hour to start.
2. You would be working mostly on the table saw, but we may need you to help in other areas if we're short-handed.
3. You would be covered under our plan, but not your family.
4. All the major holidays: Thanksgiving, Christmas, New Years, Labor Day and Memorial Day.
5. Not in the U.S., but I have had four months of training here.
6. Yes, I have a boy and a girl.
7. After the trial period you'll get another 25 cents, and after that, every six months.
8. We're not far from where the #32 bus stops.
9. I only have a tape measure and a screwdriver.
10. Occasionally we might ask you to come in on Saturday.

Number 6 is an answer to a question which is technically illegal. With more advanced students we usually raise the issue of illegal interview and application questions in the context of discussing equal opportunity, but suggest that most students contact us if they feel that they have been discriminated against, rather than attempt to handle the situation themselves.

WHAT ARE THEY TALKING ABOUT?

Read the following statements and explain what the situation might be: who is talking, where the conversation is taking place, and what has happened or is happening.

Example: It's company policy. You've got to wear them...and if you don't, you could lose your job. Okay?
The shop foreman is telling a new worker why he has to wear safety glasses.

1. For the last few weeks I've been getting really bad headaches that just won't go away. There must be something you can give me.

2. Ah, yes. You have an appointment to see Mr. Sawdust at 2:00. Take a seat and I'll call you when he's free. In the meantime I'll look for your application.

3. I missed the bus and the next one was half an hour late. I promise it won't happen again.

4. He wasn't paying attention and the board came away from the fence. Next thing I knew, he was on the floor halfway across the room.

5. I'm afraid I'm not going to be in today. It must be the flu. I'll call again tomorrow if it doesn't go away.

6. Sorry, we don't have any wire pulls in stock right now, but we can order them for you. How many do you need?

7. I don't know how to fill this out. Should I claim 1 or 2 deductions?

8. I'm at 42nd and Spruce, and I need to get to 54th and City Line Avenue. Can you tell me the easiest way to get there and what the fare will be?

9. Why is it you haven't been employed for the last two years?

ERROR IDENTIFICATION

Common errors in woodworking procedures are presented in each of the following passages. Read each passage and explain what mistakes are made.

1. He secured the bit in the router and put his safety glasses on. Next he placed the base of the router flat against the surface with the bit right against the edge to be shaped. Then he turned the router on.

2. The table top was 36" x 60". She carefully measured the laminate and cut it at 36" x 60" on the table saw. Then she applied contact cement to the table top and the laminate, and allowed it to dry.

3. He put on his dust mask and applied the contact cement with a roller. When the cement had dried, he laminated the drawer front.

4. She put on her safety glasses. She made sure that the board with the slight cup was placed on the jointer table with the concave surface down, and that the blades would cut against the grain. Then she turned on the jointer and began to work.

5. He adjusted the fence and turned on the table saw. He kept his eye on the blade as he ran the piece through.

6. She switched the router on and brought the bit to the edge of the board. Tilting the router slightly, she did the first edge.

7. He needed a piece 18" long. To make his measurement precise, he started from the 1" mark rather then 0, and made sure that his tape was absolutely straight. He made a pencil mark at 18", and with a square made a straight line across the board.

8. A panel made of solid stock had a $^3/_8$" tongue. They cut a $^3/_8$" groove into the frame, making a perfect fit.

SOLVING PROBLEMS IN THE SHOP

Here are some situations which may come up in the workshop. Read each passage and make suggestions on how to solve the problems.

1. You are working with 8" stock. The maximum width of the jointer table is 6". How can you face joint the stock?

2. Your stock is 10" wide, but your jointer table is only 6". The project you are working on calls for a 27"-wide surface. What could you do to make that surface, wasting as little stock as possible?

3. You have a piece of stock which is 10' long, and you need to make two pieces 5' in length. What do you do?

4. You have to install door hinges with a multi-spur bit. What tool or machine will you use?

5. You want to make a miter joint. How will you do it?

6. You have five face-jointed boards of different thicknesses. How will you get them to the same thickness?

7. You are using flat-head screws, and want the screws to be flush with the surface of the stock. What will you have to do?

8. Solid stock lipping has been joined to the edge of a laminated surface. How can you make the lipping flush with the laminate?

9. A project calls for a sliding dovetail. How will you make it?

10. Working with veneer-core plywood, you need to cut 18 dadoed drawer sides of the same dimensions. What tool or tools would you use? What procedures would you follow to get the job done as quickly as possible?

TELEPHONE EXERCISE II

Read the following job descriptions carefully, making sure you understand them completely. Select one ad, and make a telephone call to request an interview. Be sure to write down all of the information you need to get to the interview on time.

HELP WANTED

ASSEMBLER: Must be familiar with power tools. Able to measure accurately to $^{1}/_{32}$". Lamination experience helpful. $5.10/hr plus benefits. 40 hr/wk + o.t. EOE. 555-0000. Ask for Mary.

LAMINATOR: Knowledge of table saw and router a must. Formica, metal lam. and veneer exp. helpful. Will train. $4.85/hr to start. $5.25 + BC/BS after 90 days. Ted. 555-0000.

SIGN MAKER: Exp. with table saw and band saw. Good measurement skills. Sign board and plexiglass exp. preferred. Will train. $4.70/hr. F.t. or p.t. EOE 555-0000. Ask for Sal.

FRAMER: 1 yr. exp. in frame shop or equiv. training. Exp. with hardwoods and metals, miter saw, router. Good meas. skills. $5.00 hr. F.t. Union ben. after 90 days. Call Ted, 555-0000.

In this exercise, students are required to request and record information. Each ad is to be discussed in class regarding vocabulary and requirements, and each student should select one ad for calling. Before calls are made, there should be general discussion of questions to be asked and points to be covered, and students should determine the information they will need to make an appointment. In addition, the following sample conversation should be read and discussed as a means for understanding the possible flow of conversation.

Calls should be made in private, and each student should return to class with information which matches that supplied by the teacher. Discussion should focus on points of etiquette, if necessary, and problems in comprehension.

Sample Conversation

Jack: Goldsteins.

Student: Hello, may I speak with Jack?

Jack: This is Jack. Can I help you?

Student: I'm calling about the ad for the laminator in the paper.

Jack: Yeah, have you ever done lamination before?

Student: Yes. I have some training from vocational school.

Jack: Can you use a router and a table saw?

Student: Yes.

Jack: When could you come in?

Student: Whenever it's convenient for you.

Jack: How about tomorrow at 9:30?

Student: Tomorrow at 9:30? Okay. What's the name and address of the company?

Jack: Goldsteins.

Student: Could you spell that please?

Jack: G-O-L-D-S-T-E-I-N-S. And our address is 1607 S. 3rd St.

Student: G-O-L-D-S-T-E-I-N-S. 1607 S. 3rd St.

Jack: That's right.

Student: Thank you. I'll be there at 9:30 tomorrow morning.

Jack: At the front desk, ask for Bill, okay?

Student: Okay. Thank you.

Jack: Bye.

ANALOGIES

Give the appropriate answer. Explain.

Example: apple : fruit as potato : ?
apple : fruit as potato : *vegetable*

1. hammer : nail as screwdriver : ?
2. soítwood : needle as hardwood : ?
3. high : height as deep : ?
4. goggle : eye as respirator : ?
5. bark : tree as skin : ?
6. $^1/_4$: $^1/_2$ as $^1/_{32}$: ?
7. saw : sawdust as plane : ?
8. page : book as veneer : ?
9. add : plus as subtract : ?
10. blade : saw as bit: ?

THIS IS JUST TO SAY...

In each of the stanzas of the following poem by William Carlos Williams, the lines have been taken out of order. Put the lines back into order.

This is Just to Say

that were in

I have eaten

the icebox

the plums

saving

and which

for breakfast

you were probably

and so cold

Forgive me

so sweet

they were delicious

107

ORDER OF EVENTS

The following groups of events make up familiar situations. For each group, explain the situation, and put the events into the order in which you think they should happen.

Example:

enter
knock, or ring doorbell
wait for invitation to come in
greet your friend

Situation:
visiting a friend at home
Order:
1. *knock, or ring doorbell*
2. *greet your friend*
3. *wait for invitation to come in*
4. *enter*

A. interview
contact employer
network with friends
get results of interview
apply

B. wait for aspirin to work
call employer
take aspirin
wake up with headache

C. make person comfortable
alert others/ask for help
call ambulance
turn off machine

D. ask about pay and benefits
answer questions
ask about duties
ask about hours

E. write down information
telephone
ask about schedules and fares
give destination
verify information
give current location

F. unplug machine
call foreman
turn off machine
blade breaks

G. sweep up or vacuum
turn off machine(s)
put away tools and materials

H. notify co-workers
smell gas
notify foreman
put out cigarette
turn off machines

I. speak to personnel representative
wait two weeks
check paycheck
work through trial period
discover raise didn't come through

J. start new job
give two weeks notice
confirm hiring with new employer

NAMING DIMENSIONS

Dimensions of stock and pieces of furniture can be confusing.

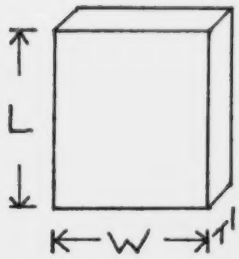
STOCK

Length
Width
Thickness

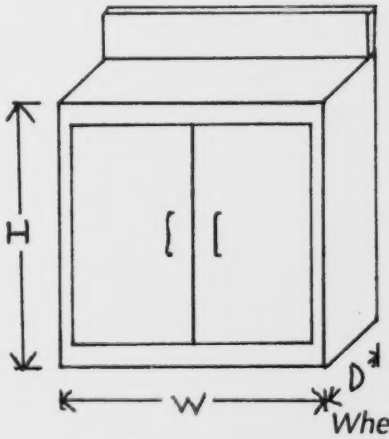
HOWEVER

FURNITURE

Height
Width
Depth



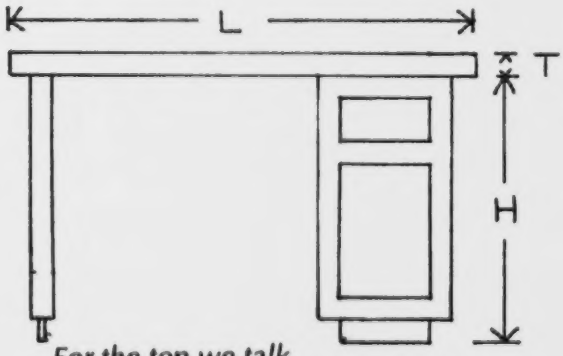
We talk about length, width and thickness of stock



When stock is part of a finished project, we use the dimensions height, width and depth

ALSO

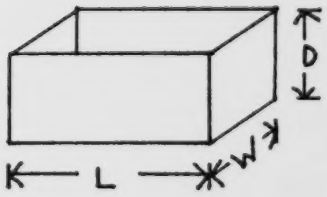
PARTS OF FURNITURE



For the top we talk about thickness and length,

but for the box we talk about width and height

AND



For the inside of a drawer, we refer to its depth

USING THE RVTC FRACTION SET

For the teaching of fractions, fractional measurement and mathematics, the CCS staff has designed a set of 186 hardwood blocks ranging in thickness from $^1/_{16}$" to 1", and a series of classroom activities which have proven extremely effective in introducing and reinforcing essential concepts for vocational skills development. See "Construction of Fraction Set," below, for instructions on reproducing these materials.

Students should be encouraged to learn to identify the fractional parts of an inch by sight.

The fraction set offers the student an opportunity to manipulate the parts of an inch, which adds an additional dimension to standard visual exercises in simple measurement with a ruler. For many students, the experience of working with the blocks seems to promote more rapid acquisition of facility with recognition.

Although some students are familiar with the metric system, we actively discourage the conversion of measurements to and from the metric system, as this is of little help in acquiring a feel for the tolerances actually used in most woodworking activities.

As a simple exercise in recognition, students are asked to guess at the thickness of various blocks, and to verify their answers by measuring with a ruler. It is useful to point out to the students that the block can be measured at any point on the ruler by comparison with the ruler's graduations; the notion that absolute measurement is independent from the numbers on a measuring instrument is a difficult one for some students to grasp.

The blocks can be utilized in various ways to introduce or review such concepts as equivalent fractions and common denominators, and as an alternative to written exercises in the addition and subtraction of fractions.

Of all the activities utilizing the fraction set blocks, the most appealing to the students are the various "games" used to develop abilities in quick mental arithmetic:

Basic Game: An equal number of blocks, excluding 1", are distributed to each player. The first student places a block on the table and states its thickness. The next student adds another block, stating its thickness and the resulting thickness of the pile, reducing the fractional measurement to proper terms as necessary. Play continues until a student is forced to

add a block which makes the total thickness of the pile 1" (or any other size specified prior to play). That student must then take the pile and add it to his or her own "bank." The winner of the game is the one who plays out all of his or her pieces first.

Variation: Same as above, except that the object of the game is to make the pile equal whole inches in thickness. The player who causes the pile to equal exactly 1" (or more as determined beforehand) is rewarded by taking all the blocks in play. The game ends when one player loses all of his or her blocks. Players measure the total thickness of their remaining pieces to determine the winner, i.e. the player having the thickest "bank."

For more advanced students, giving a wrong answer, e.g. an improper fraction or an incorrect answer, might be cause for taking the pile in the basic game, or not taking the pile in the variation.

CONSTRUCTION OF FRACTION SET

PROJECT DESCRIPTION

Equipment: band saw, jointer, planer, table saw, crosscut jig, stop block, spacer

Stock: $^{8}/_{4}$" tight-grained hardwood

Procedure:
Rip stock to 2" on band saw. Joint and plane at least 55" of stock to approximately 2" square.

Clamp the stop block to the crosscut jig. A spacer (any thickness) must be set between the stop block and the stock, as without it the cut piece might become wedged between the stop block and the blade and get mangled.

Having measured the desired distance from the blade to the spacer, set the stock to be cut, remove the spacer, and make the pass on the table saw.

Repeat the passes, readjusting the stop block as follows:

Thickness	No. of Passes
1"	6
1/2"	12
1/4"	24
1/8"	48
1/16"	96

MEASUREMENT PROBLEMS

In solving these problems, remember to accout for waste and kerf.

1. How much stock do you need in order to cut six 1" pieces?

2. How much stock is needed in order to cut twelve 1/2" pieces?

3. How much stock do you need to cut twenty-four 1/4" pieces?

4. How much stock is needed to cut forty-eight 1/8" pieces?

5. How much stock will you need to cut ninety-six 1/16" pieces?

6. For the operations done in 1 through 5 above, what is the total length of the cut pieces?

7. For the operations done in 1 though 5 above, what is the total amount of stock lost because of kerf?

8. How could you cut all of the pieces required in 1 though 5 wasting as little stock as possible?

9. How many $^1/_2$" pieces could you get from a piece of stock measuring one foot? How much stock would you loose to kerf?

10. How many $^1/_{32}$" pieces would you get from a piece of stock measuring six inches? How much stock would you loose to kerf? What would be the major problem in cutting pieces with a thickness of $^1/_{32}$"?

The project description presented here can be used to construct the Refugee Vocational Training Center Fraction Set, described on the previous page. It would be best to introduce this lesson after the set has been used by the class.

The project description itself can be used as a reading assignment, serving as a basis for discussing the following issues: structural qualities and cost of stock; the need to consider kerf and waste in project planning and lay-out; and the solution to practical problems in woodworking through the design and use of jigs.

ADDITION OF FRACTIONS

1. What is the total thickness of three boards $^{5}/_{16}$", $^{5}/_{8}$" and $^{7}/_{8}$"?

2. What is the total thickness of a table top made of $^{3}/_{4}$" particle-board covered with $^{1}/_{16}$" plastic laminate?

3. A desk top is $^{3}/_{4}$" thick. It is covered with $^{1}/_{4}$" plate glass. Find the total thickness.

4. Find the total thickness of three pieces of plywood, $^{5}/_{8}$ inch, $^{3}/_{8}$ inch, and $^{3}/_{4}$ inch thick.

Note that each of these problems is presented using different sentence structures. It is often the case that ESL students receiving short-term, formal language instruction are given exposure to a limited range of grammatical constructions. While restricting the number of structures used may allow for a simplified, more straightforward presentation of English grammar, refugee students often lack the ability to interpret forms with which they have no familiarity. The language employed in everyday communication is far from regular, and it is important to prepare students for the task of interpreting what they hear as they hear it. It is often useful to have students try to paraphrase sentences, allowing the teacher to test the student's understanding and the student to experiment with diverse means for expressing the same message or question.

KERF PROBLEMS

Solve the following problems, remembering to account for kerf.

1. A board is 5' long. How long is the cutoff if you cut a piece that is $3\frac{1}{2}$' long?

2. One board is $\frac{3}{4}$ of a foot long. Another is $\frac{1}{2}$' long. When they are fastened together, what is their combined length?

3. How many 3" wide pieces can you get from a piece of stock which is 3' in length?

4. You have glued two boards together. One was $\frac{1}{2}$ foot wide. The other was 5" wide. How wide is the new piece?

5. Measure the length of the table in your classroom. If you cut it in half, how long will each piece be?

Simple math problems are often complicated by factors such as kerf, the amount of material lost in cutting. In cabinetmaking, as in many other fields, precision of measurement is crucial, and we have found that it is often necessary to emphasize the importance of taking time in solving problems to avoid the omission of essential information.

FIGURING BOARD-FOOTAGE

Figure the board-footage for each of the following loads of stock.

1. 10 pieces @ 12' x 6" x $\frac{4}{4}$"
2. 15 pieces @ 8' x $6\frac{1}{2}$" x $\frac{8}{4}$"
3. 12 pieces @ 10' x 8" x $\frac{6}{4}$"
4. 10 pieces @ 14' x 9" x $\frac{4}{4}$"
5. What is the total board-footage of the four loads?

Lumber is usually sold by the board foot, defined as 12" x 12" x 1" (i.e. 144 cubic inches). Thickness is measured in quarters. While many students may never have to deal with board footage directly, knowledge of how lumber is sold is valuable for those who might eventually go on to purchasing or management positions. Computing board footage is useful as an exercise for all students, as it requires many of the mathematical skills necessary for solving practical measurement problems.

READING A RULER

Using a ruler, rule or tape, find the graduation between the following pairs of measurements, and write the answer in the space provided.

1. Give your answer in sixteenths ($^1/_{16}$) of an inch.

a. $^5/_8$ _____ $^3/_4$

b. $^1/_8$ _____ $^1/_4$

c. $^1/_2$ _____ $^5/_8$

d. $^1/_4$ _____ $^3/_8$

e. $9\,^7/_8$ _____ 10

f. $3\,^3/_8$ _____ $3\,^1/_2$

g. 5 _____ $5\,^1/_8$

2. Give your answers in thirty-seconds ($^1/_{32}$) of an inch.

a. $^{13}/_{16}$ _____ $^7/_8$

b. $^3/_8$ _____ $^7/_{16}$

c. $^1/_4$ _____ $^5/_{16}$

d. $^3/_4$ _____ $^{13}/_{16}$

e. $^7/_{16}$ _____ $^1/_2$

f. $2\,^1/_8$ _____ $2\,^3/_{16}$

g. $9\,^1/_2$ _____ $9\,^9/_{16}$

h. $7\,^7/_8$ _____ $7\,^{15}/_{16}$

i. $^5/_8$ _____ $^{11}/_{16}$

The instructor may choose to illustrate the graduations of the ruler by drawing a line on the blackboard and then, step by step, dividing the line into halves until $^1/_{32}$ is shown.

SIMPLE WORD PROBLEMS

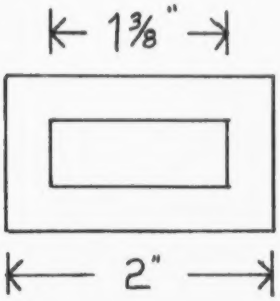
Solve the following problems. For problems 1 through 3, make a small drawing of the object described in the space provided.

1. A wall is ten and a half feet (10 $^1/_2$') wide and twelve feet (12') high. If you center a mirror that is four feet (4') wide and three feet five and a half inches (3'5 $^1/_2$") high, how many feet will be left on each side?

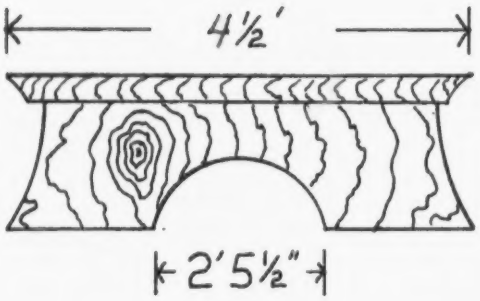
2. A wall is twelve feet high. The window in that wall is five feet high. The window is placed so that $^3/_4$ of the wall space lies below the window and $^1/_4$ lies above. What is the distance between the top of the window and the ceiling? Between the bottom of the window and the floor?

3. A cabinet made of $^3/_4$" stock is 15' wide. If you build a drawer that has $^1/_2$"- wide mechanical runners, how wide will the drawer be?

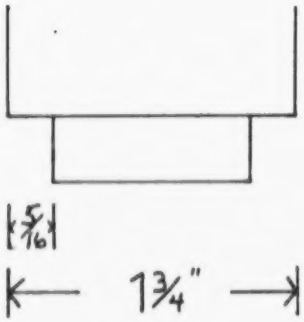
4. A fortune teller told John that he would marry a woman who is $^3/_4$ his age. If John is 32 years old, how old will his wife be?



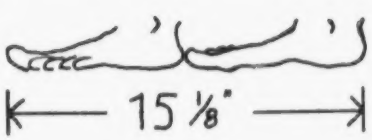
1. How wide are the shoulders?



2. How wide are the legs?



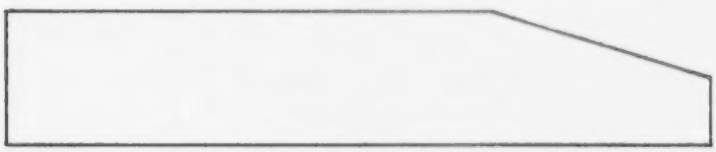
3. How wide is the tenon?

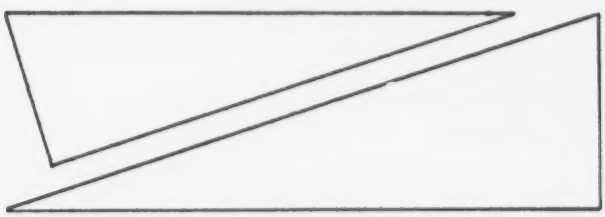


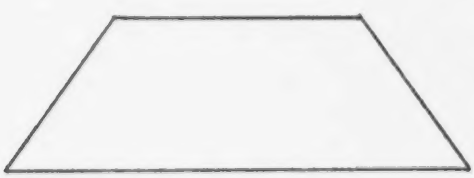
4. If my left foot is $^1/_8$" bigger than my right, how big are each of my feet?

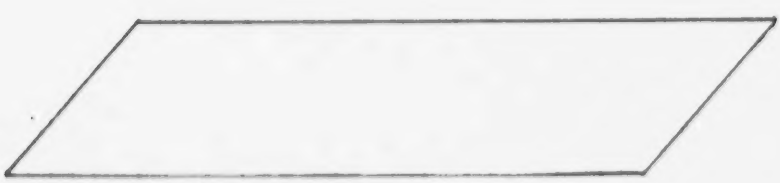
LINEAR AND ANGULAR MEASUREMENT

Using a rule and a protractor, measure and label the lines and angles of the figures shown below.

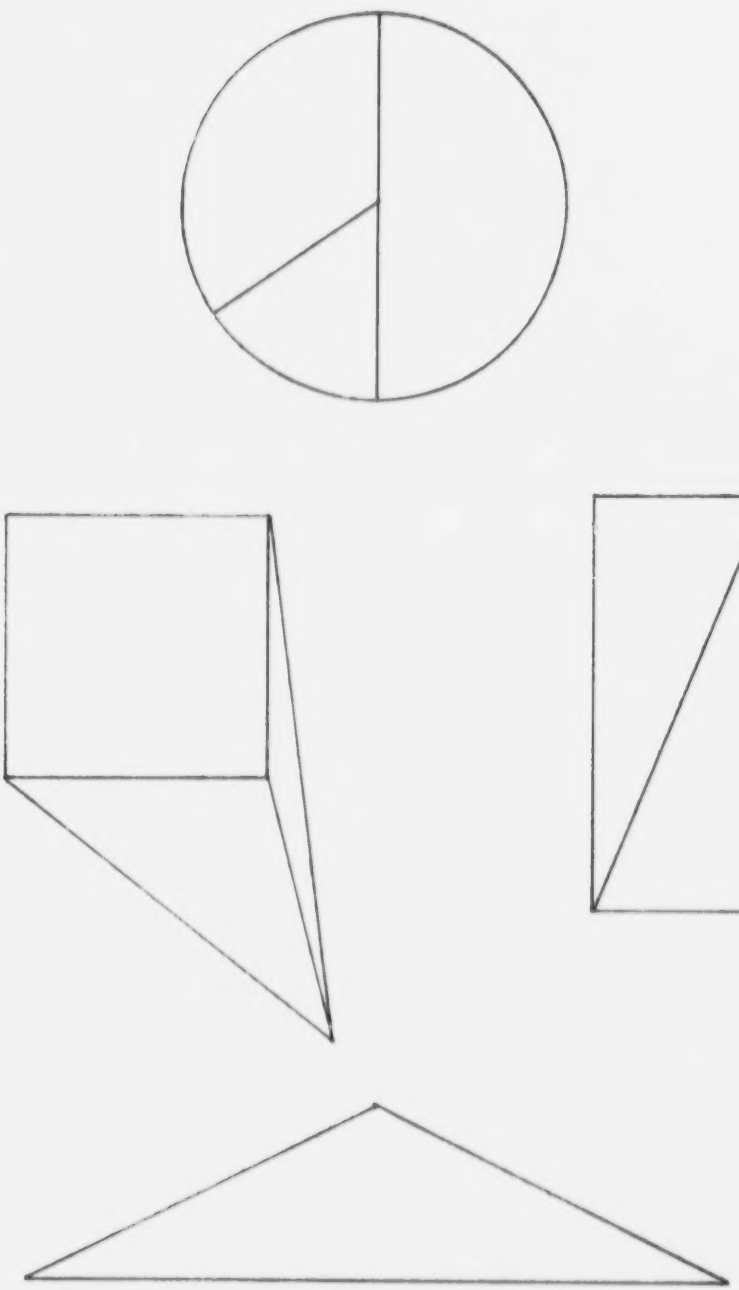








119



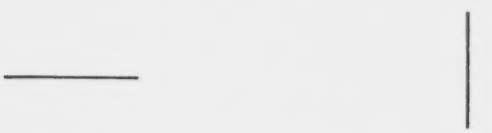
This exercise serves as a good lead-in to discussion of simple geometric concepts and their applications to design and layout in woodworking.

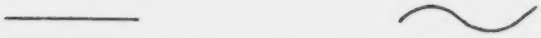
COMPARISON OF LINES

Compare each set of figures and describe how they are similar and how they differ.

1.

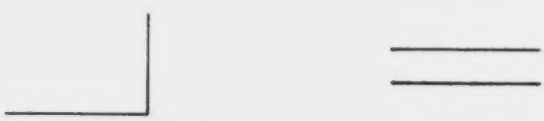
2.

3. 

4. 

5.

6.

7. 

This is a good introduction to notions in linear geometry, ideal as preparation for instruction in mechanical drawing.

To underscore the need for precision in description, have students describe these figures to the teacher or a student, who must draw them on the blackboard. Students should be encouraged to ask for clarification in attempting to follow instructions. This technique can also be applied to the study of other kinds of geometrical figures.

FIRST DRAWING ASSIGNMENT

Make a drawing in the space below of a piece of stock provided by your instructor, and fill in the information under the drawing.

Piece No._____ Length_____

Stock _____ Width_____

Thickness_____

Flaws_____

Pieces of stock should be numbered with chalk, and each student should ideally have his or her own piece to draw. We suggest using stock which has been cut to relatively regular shape, to avoid problems in measuring.

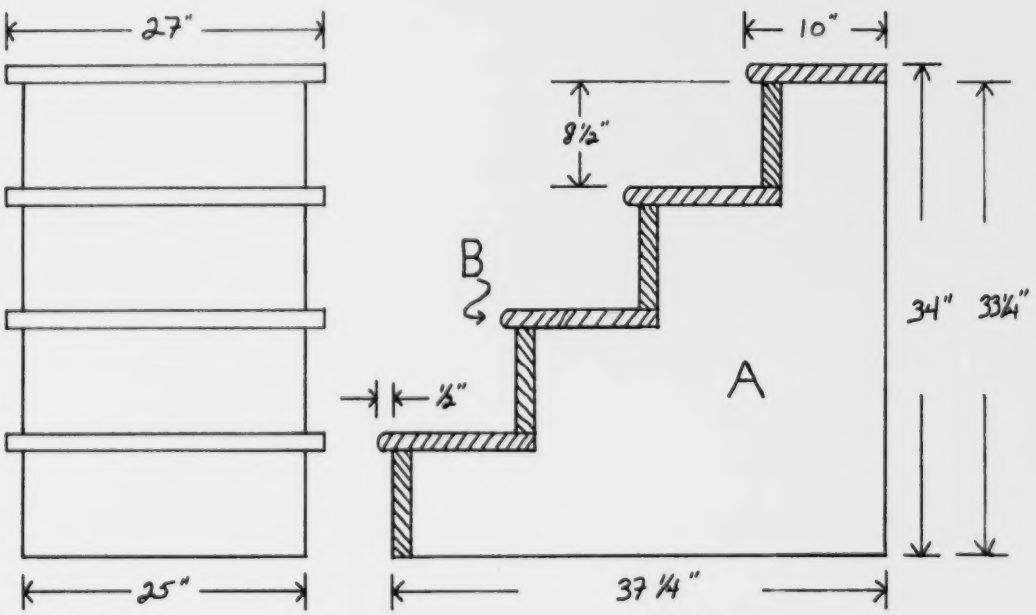
This is a useful tool for assessing a student's ability to draw a representation of a simple three-dimensional object. Our experience has shown that some students have little or no knowledge of this kind of drawing, and that this is not as simple a task as it may seem.

In addition to being a test of the student's ability to draw, measure, and to recognize wood types and flaws, this exercise can be used to introduce or review the process of evaluating the quality and usefullness of a piece of stock: a student might be asked to consider the flaws and the condition of the board and to determine the size of the piece which could be used, once it has been machined and the flaws removed.

MECHANICAL DRAWING: NAMING DIMENSIONS AND PARTS

Answer the following questions, naming dimensions or parts of stairs, based upon the mechnical drawing below. (Drawing is not to scale.)

1. What is 34" ?
2. What is 37 $^{1}/_{4}$" ?
3. What is 27" wide?
4. What part of the stairs is $^{1}/_{2}$" ?
5. What is 8 $^{1}/_{2}$" high?
6. What part of the stairs is "A"?
7. What shape is "B"?
8. The dimensions of the top tread are:
   _____ x _____ x _____
   (length) (width) (thickness)
9. How big is the side overhang?



123

SCALE CONVERSION

Reduce the measurements given to 1/2 and 1/4 scale.

	FULL SCALE	1/2 SCALE	1/4 SCALE
Total height	39"		
Total width	16"		
Backsplash	3"		
Counter top	1 1/2"		
Drawer	15 1/4" x 4 1/2"		
Door	15 1/4" x 25"		
Dividers	1"		
Kick	3"		
Revealed stock	3/8"		

SCALE DRAWING EXERCISE

A mechanical drawing is done to **scale**. Drawing to scale means reducing all measurements in exactly the same way to keep the proportions correct.

A piece of stock is 1' x 4" x 1". If the scale is $^1/_2$" = 1", then the dimensions of the drawing will be:

length: 1' = 12"; 12" divided by 2 equals _____
width: 4" divided by 2 equals _____
thickness: 1" divided by 2 equals _____

The drawing will be _____" x _____" x _____"

Draw this piece of stock, showing all three views (elevation, end view and plan).

Next, figure out the dimensions of the mechanical drawing of the same piece of stock at a scale of:

1. $^1/_4$" = 1" _____
2. $^1/_8$" = 1" _____
3. $^1/_{16}$" = 1" _____

DRAWING FROM SPECIFICATIONS

For each of the following problems, draw the piece described in elevation and answer the questions. The drawings do not have to be to scale.

1. A table is 16' x 4 1/2'. Its legs are 3/4" x 3/4" x 4 1/2'. The height of the table, from floor to top is 4' 7 3/4". Rails, 3/4" thick and 3" wide, are joined to the legs with 1/4" tenons.

    a. How thick is the table top?

    b. How long are the front and side rails?

2. A cabinet , built with 3/4" stock, is 36" wide and 24" deep. It has a counter top which is 1 1/2" thick, and a backsplash which is 2 1/2" high. A 6 1/2" high drawer is placed above a door which is 35 1/4" high. The sides of the drawer are flush with the carcass with a 3/8" overlap. The drawer rides on two 1/2" mechanical runners. The stretchers between the counter and the drawer and between the drawer and the door are both 1" high. There is a 2 1/2" kick below the floor of the cabinet.

    a. What is the total height of the piece?

    b. How wide are the stretchers?

    c. How wide is the drawer opening?

As supplemental exercises, have students redo their drawings to scale; provide the missing views; redraw the pieces in perspective.

PLANNING A PROJECT

Refer to the drawings on the opposite page in answering the following questions.

A. Give the names of each of the parts labeled in the drawings.

1. _____

2. _____

3. _____

4. _____

5a. _____

5b. _____

B. What materials would you use in building this table?

C. What machines and tools would you use?

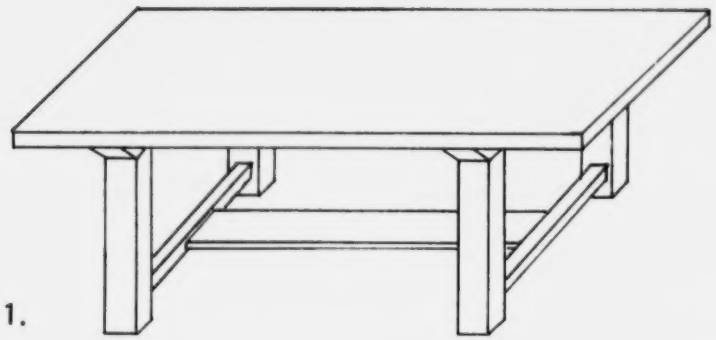
D. What joints would you use?

E. What would be the order of operations?

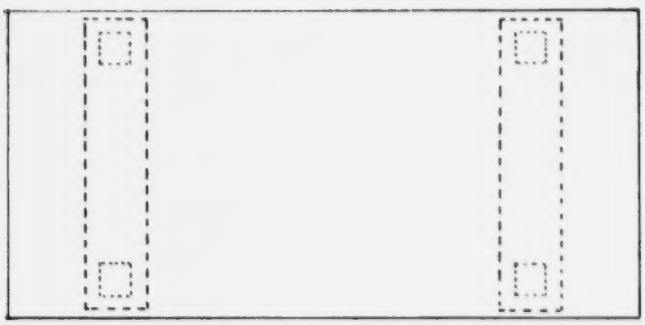
F. Choose your own dimensions for the table. Label the drawings, and make up a cutting list.

Part	#	Length	Width	Thickness	Material	Machining

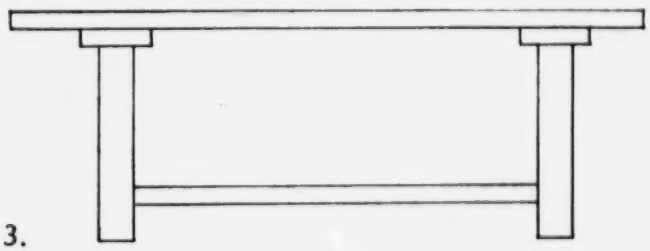
This exercise should be presented as a group activity, once the class has completed a few projects in the shop.



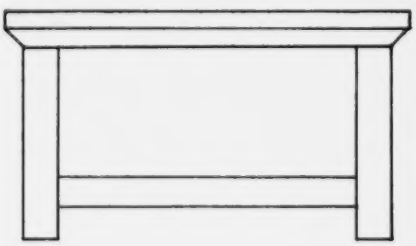
1.



2.

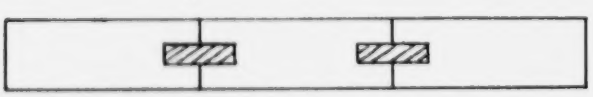


3.



4.

5a.



5b.

DRAWING TO SCALE

Starting at the point in the circle, draw lines to scale according to the directions given below:

right 10'4" @ 1/4" = 1'0" *is read: from the last point, draw a line to the right which represents 10'4" where the scale is 1/4" to 1'0".*

1. right 6" @ 1" = 1"
2. down 2'6" @ 1/2" = 1'0"
3. right 10'4" @ 1/4" = 1'0"
4. down 30'9" @ 1/8" = 1'0"
5. left 4'2" @ 3/4" = 1'0"
6. down 1'10" @ 3/8" = 1'0"
7. left 10" @ 3" = 1'0"
8. up 3'4" @ 3/4" = 1'0"
9. left 24'6" @ 1/8" = 1'0"
10. up 15'0" @ 1/4" = 1'0"

The teacher should supply grid (quadrille ruled) paper with the circled starting point in the upper left-hand corner.

DESIGN PROJECT

Design and make three-view and perspective drawings of a piece of furniture. The drawings should be to scale. In addition, provide the following information:

1. Type of furniture
2. Materials needed
3. Tools/machinery needed
4. A list of joints and/or fasteners used
5. A cut list

This is an ideal end-of-cycle project. An easier exercise for earlier in the course is the drawing of a piece of furniture from home or in the classroom.

Part IV: Annotated Bibliography

General ESL

Azar, Betty Schrampfer. *Understanding and Using English Grammar.* Englewood Cliffs, New Jersey: Prentice-Hall, 1981.

Comprehensive reference grammar with academic orientation and approach. Useful as a source of ideas for developing structure exercises.

Byrd, Donald R.H. and Isis Clemente-Cabetas. *React Interact: Situations for Communication.* New York: Regents, 1980.

Interesting problem-solving exercises with socio-economic perspective, for more advanced students. Weak grammatical structure exercises.

Dixson, Robert J. *Graded Exercises in English.* New York: Regents, 1983.

Very dry, unimaginative approach to grammar; does not encourage creative use of language. Students with higher education acquired overseas tend to find the rigid, systematic format familiar, and may prefer it to more creative approaches.

Fowler, W.S. and Norman Coe. *Practise Your English.* Walton-on-Thames, England: Thomas Nelson, 1982. Reprint, 1985.

Good reference text, with brief explanations of grammatical concepts and many examples.

Graham, Carolyn. *Jazz Chants.* New York: Oxford University Press, 1978.

Excellent for pronunciation and speech rhythm practice. Some exercises can be used thematically, e.g. "Warning" for safety issues.

Granger, Colin. *Play Games with English.* London: Heinemann, 1980. Reprint, 1985.

While not really appropriate for use in a VESL program, this book is useful as a source of ideas for designing exercises.

Greatsinger, Calvin. *Signs Around Town.* Syracuse, New York: New Reader's Press, 1976.

Very good for survival and VESL reading practice.

Hill, L.A. *Picture Composition Book.* London: Longman Group, 1961. Reprint, 1979.

Engaging approach to communication practice. Good for organizing an essay or simple dramatic monologue, for developing dialogues, and for vocabulary and verb tense practice.

Jones, Leo. *Notions in English: a Course for Upper-Intermediate and More Advanced Students.* New York: Cambridge University Press, 1979. 6th ed., 1984.

Enjoyable, thought-provoking text for advanced students.

Jones, Leo and C. Von Baeyer. *Functions of American English: Communication Activities for the Classroom.* New York: Cambridge University Press, 1983. 4th ed., 1985.

Very good examples of dialogue and idiomatic speech; interesting ESL activities for intermediate students.

Markley, Rayner and Willard D. Sheeler. *Spot Drills: Low Intermediate.* New York: Oxford University Press, 1983.

Extremely useful, well-designed structure exercises and reading passages.

Merdinger, Polly and Joel Rosenfeld. *Even if You Can't Carry a Tune: Grammar Through Popular Songs.* Rowley, Massachusetts: Newbury House, 1984.

Very creative approach to structure and pronunciation through music.

Mortimer, Colin. *Dramatic Monologues for Listening Comprehension: Resource Material for Listening and Fluency Practice.* New York: Cambridge University Press, 1980. 4th ed., 1985.

Imaginative and challenging approach to listening comprehension for higher intermediate students.

Shapiro, Toni. *Settling In 2: a Competency-based Curriculum for U.S. Cultural Orientation.* Brattleboro, Vermont: The Consortium, 1985.

Provides a valuable overview of the approach to cultural orientation and survival skills training used in refugee camp educational programs.

VESL and Job-Search

Armstrong, Fiona, Myra K. Baum and Joan Block Miller. *Life Works: a Realistic Job Search.* New York: McGraw-Hill, 1980.

Best used as a resource book for exercise development; good coverage of issues in self-evaluation.

Collins, Huntly. "Still, a struggle for minorities in craft unions." *Philadelphia Inquirer,* Jan. 19, 1986.

Consortium, The. *Shifting Gears 2: Hands-on Activities for Learning Workplace Skills and English as a Second Language.* Brattleboro, Vermont: The Consortium, 1984.

Impressive collection of materials aimed at introducing refugees to new living, working and language situations. Presents some good ideas for hands-on activities.

Dresner, Joanne, Kenneth Beck, Clare Morgano and Luise Custer. *It's Up to You: Language Skills and Strategies for Getting a Job.* New York: Longman, 1980.

Good situational presentations of job-related concepts and vocabulary; useful exercises in self-evaluation.

Fisher, David and Reginald Brogonier, Jr. *What's What: a Visual Glossary of the Physical World.* Maplewood, New Jersey: Hammond, 1981.

Excellent reference; labelled drawings are especially useful for vocabulary development and description exercises.

Follett Coping Skills Series. *Job Interviews.* New York: Follett, 1978.

Presents a good list of the stages an applicant goes through in getting ready for and having an interview. Activities, situational presentations and sample forms are useful, especially for lower intermediate students.

Friedenberg, Joan E. and Curtis H. Bradley. *The Vocational ESL Handbook.* Rowley, Massachusetts: Newbury House, 1984.

VESL in a nutshell—cursory discussion of important issues. Well-structured overview for new VESL teachers, covering terminology, program design, lesson planning. Examples are plentiful.

Jupp, T.C. and S. Hodlin. *Industrial English: an Example of Theory and Practice in Functional Language Teaching for Elementary Learners.* London: Heinemann, 1975. Reprint 1983.

Nicely balanced presentation of theoretical and practical aspects of the functional approach to teaching workplace communication skills. Enlightening reading for teachers new to VESL.

Mrowicki, Linda. *Let's Work Safely!: English Language Skills for Safety in the Workplace.* Palatine, Illinois: Linmore, 1984.

Good introduction to safety equipment and dangerous situations/practices in the workplace. Ideal for students with limited proficiency in English. Many good illustrations.

Robinson, Catherine and Jenise Rowekamp. *Speaking up at Work.* New York: Oxford University Press, 1985.

An important VESL resource and classroom text. Dialogues and reading passages are both realistic and informative.

Savage, K. Lynn, Mamie How and Ellen Lai-Shan Yeung. *English that Works 1: ICB-VESL.* Glenview, Illinois: Scott, Foresman, 1982.

Although some passages are useful for reading comprehension, this book is poorly layed out and of little practical use.

Special Service Supply. *Job Application Skill Text for Work World Candidates.* New York: Special Service Supply, 1968.

Provides a great variety of sample job applications, but offers no explanation or exercises.

Stein, Wendy. *Filling Out Forms: Practical Communications Skills 3.* Syracuse, New York: New Readers Press, 1979.

Useful for lower level students, as it presents in simple terms the basic concepts necessary to understanding and filling out forms.

Math, Measurement and Mechanical Drawing

Bartholomew, Roy A. and Francis J. Orr. *Learning to Read and Make Mechanical Drawings.* Peoria, Illinois: Bennet, 1937. 5th ed., 1982.

Sound presentation of the basics of mechanical drawing, appropriate to the level of VESL students with limited English proficiency. Plenty of practical, graded exercises with many applicable to basic woodworking.

Bradford, Robert. *Mathematics for Carpenters.* Albany, New York: Delmar, 1975. Revised ed., 1977.

Advanced mathematics applied to practical problems in carpentry. Better for developing exercises than for direct use.

Contemporary Books. *Building Basic Skills in Mathematics.* Chicago: Contemporary Books, 1981. 3rd ed., 1984.

Good source of basic math exercises. Lacks sufficient fraction exercises, but useful as an introduction to concepts and operations.

Glassboro State College. *Breakthrough to Math Series.* Syracuse, New York: New Readers Press, 1978. Revised eds., 1982, 1983.

Simple introductory texts dealing with fractions and simple geometry.

Howett, Jerry. *Number Power 1: Addition, Subtraction, Multiplication and Division.* Chicago: Contemporary Books, 1976. 4th ed., 1982.

Page after page of useful exercises in simple math with whole numbers.

Huth, Harry C. *Practical Problems in Mathematics for Carpenters.* Albany, New York: Delmar, 1955. 4th ed., 1985.

Essential text for practical math problems and ideas. This is one in a series of texts intended for students in diverse trades areas. Highly recommended.

Kahn, Charles H., Sylvia K. Herring and Robert Tong. *Measure Up.* Belmont, California: Pitman Learning, 1968.

Satisfactory as a source of basic measuring problems. "Picture measurement" exercises can serve as a good introduction to notions in mechanical drawing.

Woodworking

Douglass, J.H., R.H. Roberts, Forest L. Penny and Douglas L. Polette. *Units in Woodworking.* Albany, New York: Delmar, 1946. 6th ed., 1981.

Very good resource book, with many step-by-step procedures explained through text and photographs. Valuable source of intermediate to advanced reading passages.

Edlin, Herbert L. *What Wood is That? A Manual of Wood Identification.* New York: Viking Press, 1969. 5th ed., 1981.

While primarily a reference text for instructors, this book is of great value in introducing the concepts of grain, texture and color through the use of the accompanying veneer samples.

Garrett Wade. *Woodworking: the New Garrett Wade Tools Catalog.* New York: Garrett Wade, 1986.

Excellent photographs of tools, power machinery and other supplies.

Jackson, Albert and David Day. *Tools and How to Use Them: an Illustrated Encyclopedia.* New York: Alfred A. Knopf, 1978. 5th ed., 1984.

Excellent as both a reference and classroom text, combining clear illustrations with concise information regarding function and use.

Lewis, Gaspar J. *Cabinetmaking, Patternmaking and Millwork.* Albany, New York: Delmar, 1981.

Excellent in structure, scope, layout, illustrations, suggestions for activities and exercises. Although intended for mainstream instruction, can be used selectively with students of varying levels of English proficiency.

McDonnell, Leo P. and Alson Kaumeheiwa. *The Use of Hand Woodworking Tools.* Albany, New York: Delmar, 1962. Revised ed., 1978.

Good step-by-step illustrations and explanations of procedures, most suitable to students with advanced English skills.

Wearing, Robert. *Making Woodwork Aids and Devices.* New York: Sterling, 1981. Revised ed., 1985.

Numerous examples of ingenious devices for special situations in woodworking; while too difficult to be used by students, it can serve as a starting point for the development of exercises in problem-solving.

Wilson, J. Douglas and S.O. Werner. *Simplified Stair Layout.* Albany, New York: Delmar, 1947. 2nd ed., 1973.

Comprehensive yet concise presentation of stair construction with good illustrations and step-by-step descriptions of measurement and building procedures. For use as a teacher's reference.